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Telephony®

THE JOURNAL OF THE TELEPHONE INDUSTRY

SINCE 1901

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Guaranteed Circulation This Issue
15,274 of Which 12,805 Is Paid

FALL RURAL ISSUE

T. O. P. TOPICS

Streamlined operating procedures to speed up operator work by minimizing details imperative today. See p. 36 for data on series of articles on current T. O. P., beginning in this issue.

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in the type and size you need . . .

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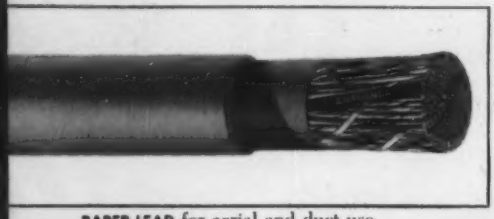

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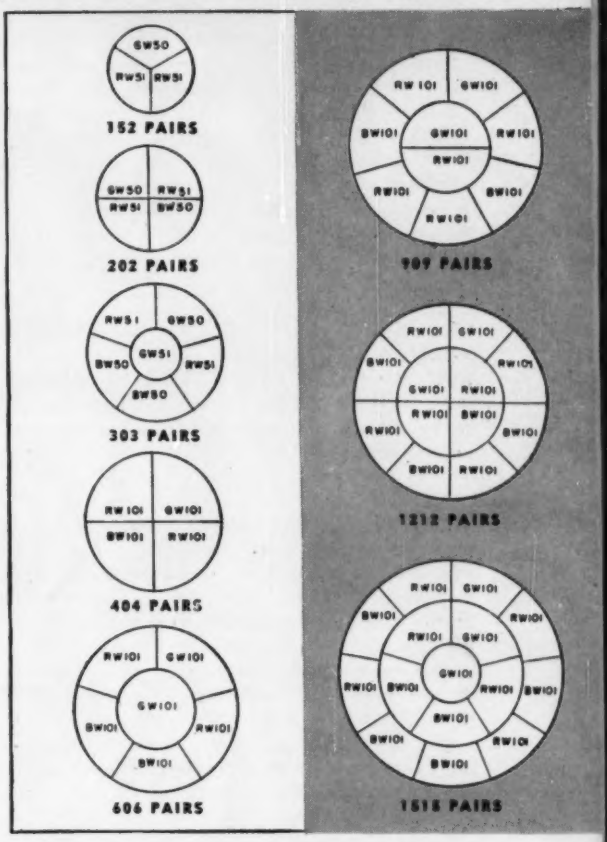
Shown here is a typical unit construction for 152 pairs through 1515 pairs, No. 24 Awg. Following constructions also available:

No. 19 Awg	6 through	455	pairs
No. 22 Awg	11 "	909	"
No. 24 Awg	11 "	1515	"
No. 26 Awg	11 "	2121	"

The number in the assemblies denotes the number of pairs in the unit. The letters refer to the color of the outside pairs of the unit. GW, green-white; RW, red-white; BW, blue-white. The units are further distinguished by a color-coded binder string.

Choose Anaconda Paper-lead Telephone Cable in the size you need.



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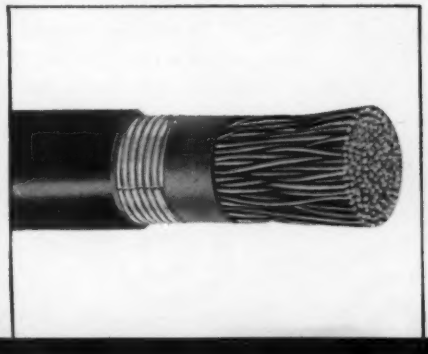
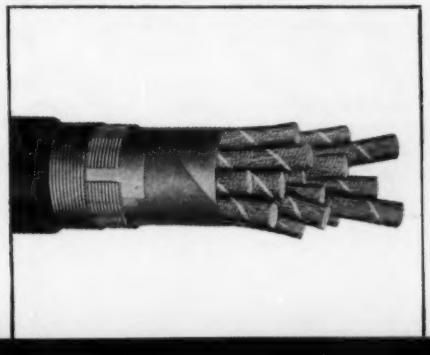
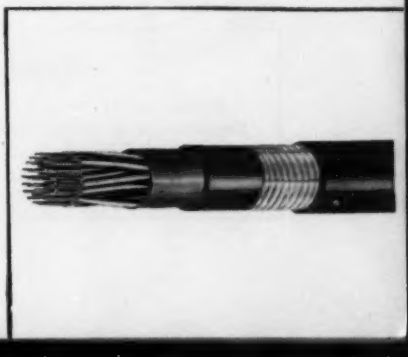


STALPETH—Paper-insulated, aluminum shield, steel tape, polyethylene jacket.



PCP DIRECT-BURIAL CABLE—Polyethylene insulation, belt & jacket.



FLASHES AND PLUGS

'TWAS THIS WAY, PODNER. This was deep in Texas, and the vast, open prairie stretched into vaster distances along the highway—a lonely vista, indeed. To a tourist couple, long conditioned by episodes of TV westerns, it was perfect as a setting.

The couple approaching in their car saw two men beside the highway, with arms upstretched, and a third, with an ominous piece of steel flashing in the sun. It was obvious that a holdup, Western style, was in progress.

Naturally, they sped to the nearest telephone and reported the crime to the police. Now, what may have been an uneventful trip before, had become a quickening, dramatic experience, providing food for excited recollection.

But back to the roadside scene. There, three telephone men were surprised when accosted by the police—they hadn't seen any holdup!

Of course—what had looked like TV drama to the imaginations of perhaps bored travelers was two linemen stringing wire, and a foreman with a large wrench!

•

TRACK-DOWN. San Francisco police cased a suspected bookie establishment and decided that it was too heavily barricaded to pull off a raid before evidence could be destroyed.

So, they telephoned the suspect, told him his place was about to be raided, and grabbed him as he ran out the door with a satchel full of betting notations.

•

WITH PLEASURE! In this wonderful day of no hands telephones, remote controls for TV sets, and other mechanical marvels, one manufacturer is reported to be experimenting with a push-button kitchen. It is said, while the homemaker takes care of the children, the machinery would handle the cooking chores for her.

Planned are pretty buttons to push—buttons on the refrigerator, for example, which when pressed, would: cook the roast; simmer the vegetables; even bake the apple pie.

Yes, steps would be reduced in this kitchen, too—for the family dinner would move from the freezer to an electronic oven on conveyor belts, and the sequence of each dish would be geared to the proper cooking time for each.

No need to keep peeking in the oven, either, to see how dinner would be coming along, because when the meal was ready, of itself, the oven door would pop open, and a mechanical device would serve dinner!

Harassed mothers and homemakers may faint with astonishment at thoughts of this maid-to-order marvel. Indeed, homemakers may wonder if they are in danger of being replaced entirely!

Alas, there *is* one thing the gadgets still could not manage. The actual eating would remain to be done by the family!

CHANGE OF ADDRESS

Please notify your local postmaster and the Circulation Department of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1904

December 5, 1959

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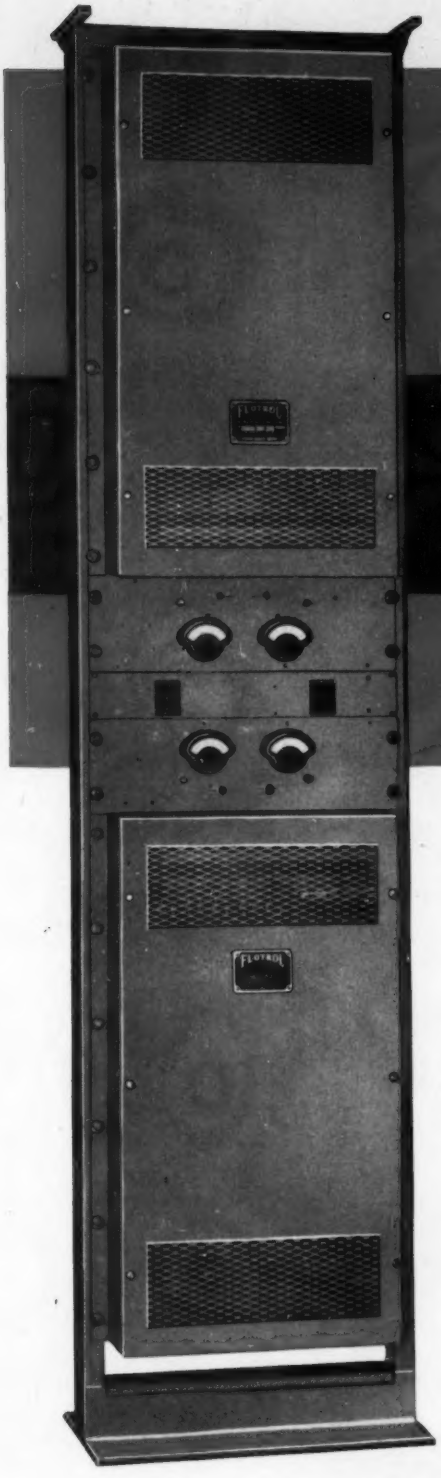

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You get standby peak capacity or additional operating capacity — without using additional costly floor space!

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Lorain Dual Flotrols are offered in many combinations of chargers, controls and accessories. You can buy complete assemblies or any part you require. Get the full story.

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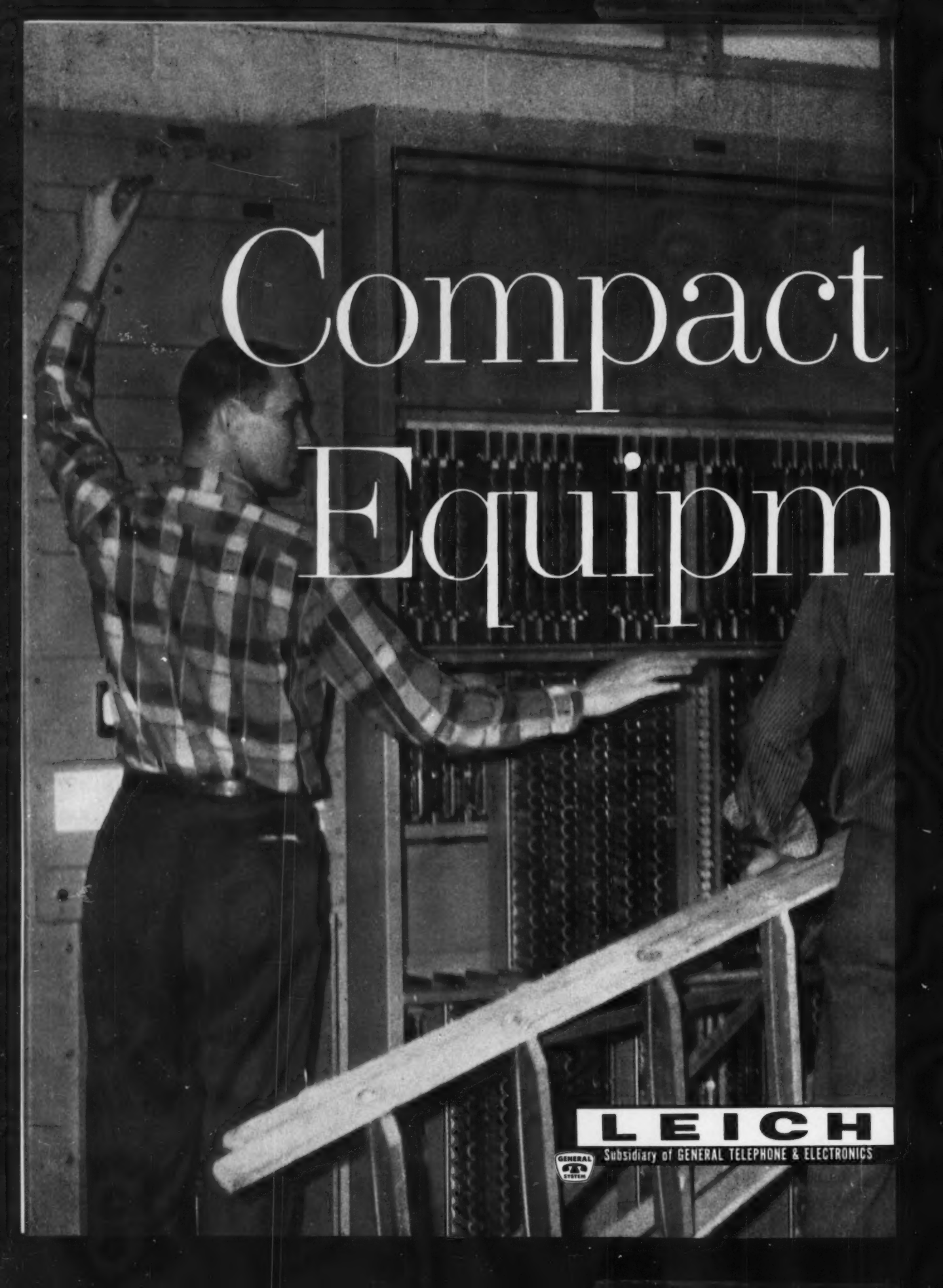
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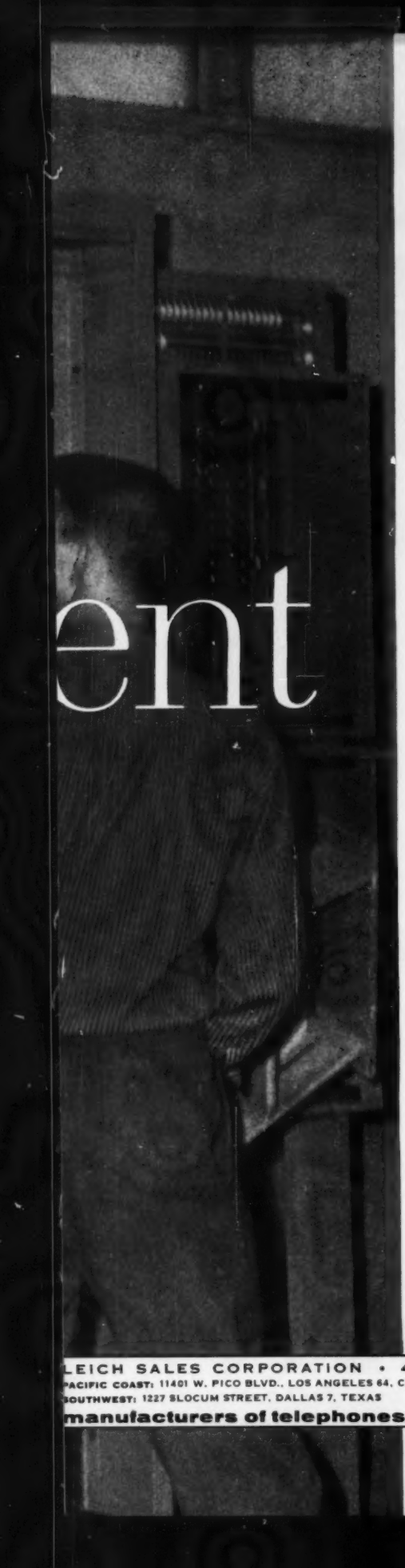

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MONEY-SAVING FEATURES OF THE LEICH DIAL SYSTEM

saves on building costs ... simplifies maintenance

When choosing a dial system it's important to consider the cost of your exchange building, as well as the cost of the switching equipment. Leich's Dial System is not only economical to install and maintain, but also saves you money by occupying a minimum of floor space.

In fact, the Leich Dial System requires less space than practically all other types of dial switching equipment. It has a uniform height of 89 inches, which makes an 8-foot ceiling adequate regardless of the size of the installation. What's more, all the equipment is accessible to your maintenance man without a ladder.

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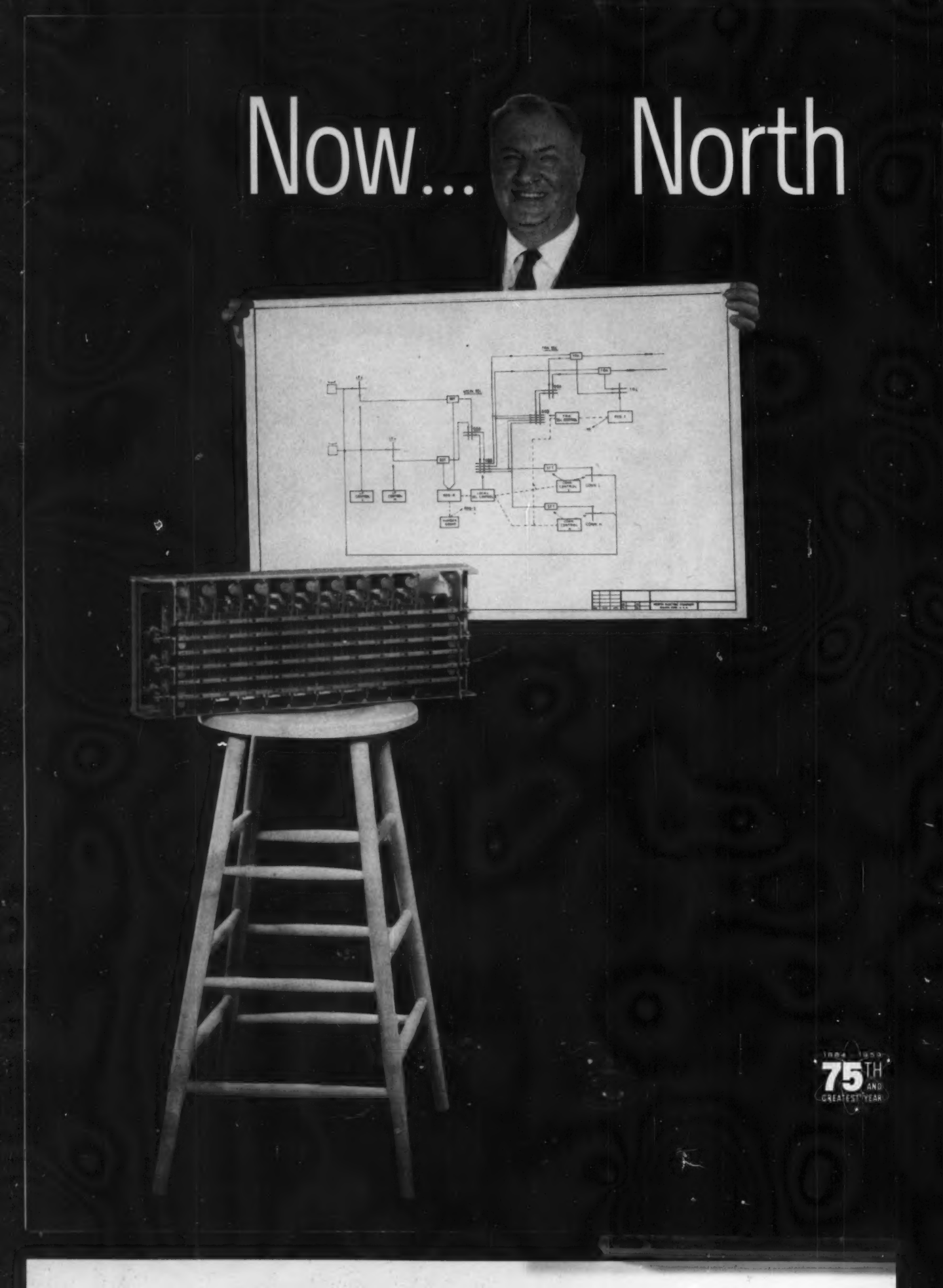

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Crossbar for even the smallest exchanges

The new North NX-2 and NX-3 bring to medium and small exchanges the inherent advantages, efficiencies and operating economies which have proven North By-Path Crossbar switching equipment the finest available to the Telephone Industry!

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NORTH ELECTRIC COMPANY

Galion, Ohio

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Like you, Graybar often is called upon for a little extra service. We wouldn't have it otherwise. For Graybar grew up with the telephone industry.

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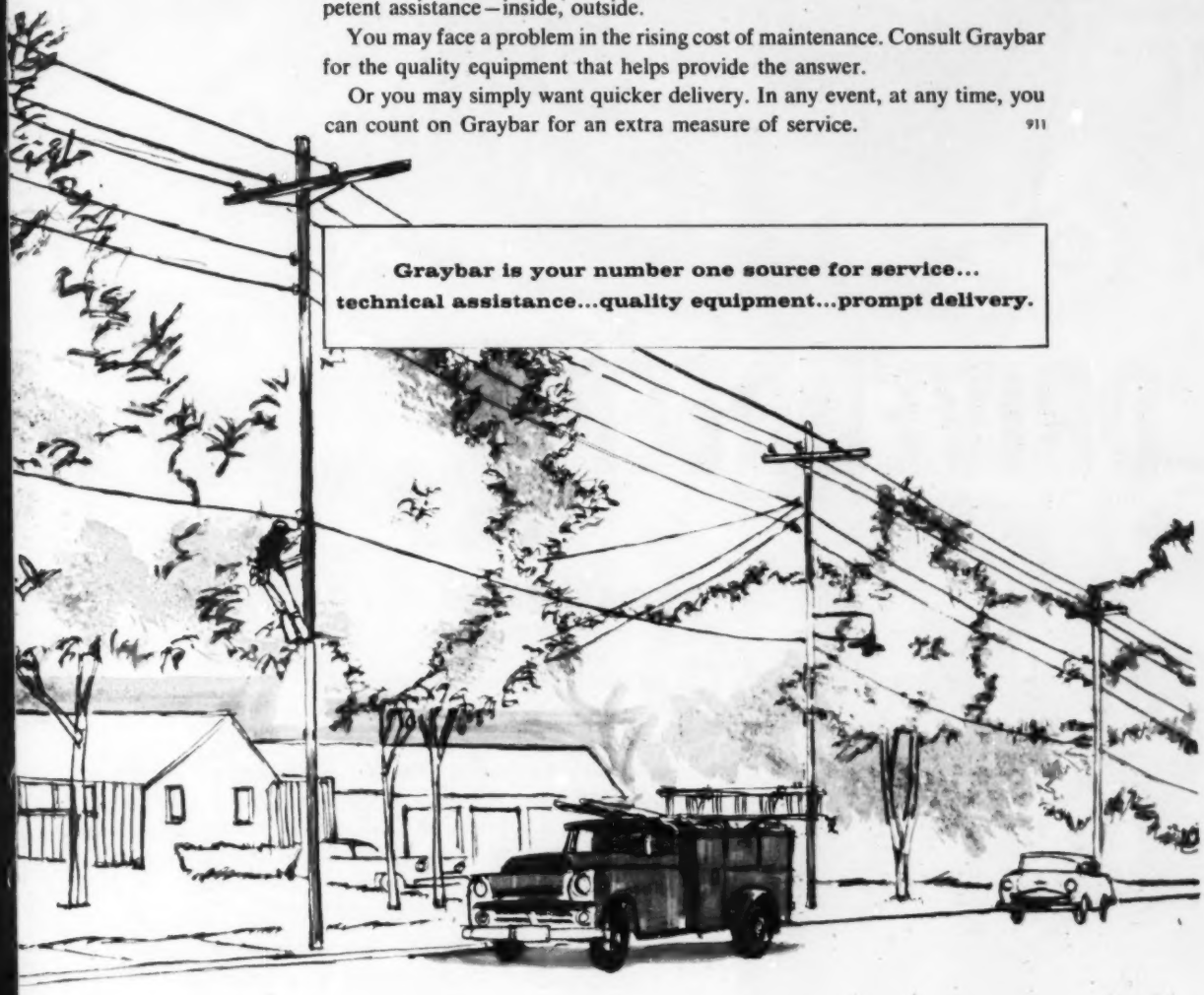
Graybar is your number one source for service... technical assistance...quality equipment...prompt delivery.



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Drive deep with Copperweld! You'll improve line performance, promote safety, avoid damage, and assure uninterrupted service.

COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION *Glassport, Pa.*
For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

YOU'RE POSITIVE WITH THE MOLTEN-WELD

This microphotograph of the weld area of Copperweld Ground Rods shows how the grains of copper and steel alloy to form a permanent, continuous weld. No other process achieves this inseparable union.

BEGINNING IN THIS ISSUE

TWO SERIES OF ARTICLES ON SUBJECTS OF INTEREST TO ALL TELEPHONE COMPANIES

★ *"PUBLIC RELATIONS in the Telephone Business" by R. L. Post*

★ *"TRAFFIC OPERATING PRACTICES" by Winnie B. Burnett*

"PUBLIC RELATIONS IN THE TELEPHONE BUSINESS"

IN HIS series of articles, Mr. Post discusses, in in a down-to-earth manner, several phases of public relations as applied to the operation of telephone companies. While these articles will be of interest to large companies which maintain public relations departments, they were especially written for the benefit of companies which have not given much thought to this most important activity.

Small and medium-sized companies, especially, will be interested in Mr. Post's articles, as they will discuss public relations ideas and techniques which can be adopted and carried out successfully by companies with limited personnel.

Following are brief outlines of the subjects Mr. Post will cover:

(1) *The General Concept of Public Relations* —what it is; what it does; what it is for. Importance of public relations as a management function, and as a factor entering into every management decision and policy, is stressed.

(2) *Informed Employes—a Key to Successful Public Relations.* Methods that any company can use to inform its employes about the company and its policies are discussed.

(3) *Informing the Public Through Newspaper Stories—Maintaining Good Press Relations.* Gives detailed "help" and suggestions in working with local newspaper people and in preparing news releases.

(4) and (5). *Planning and Conducting Special Public Relations Activities.* Practical suggestions are given in connection with holding open houses, ground-breaking ceremonies, telephone milestone ceremonies, addresses of employes before civic groups, central office visits, etc.

R. L. POST

(6) *Good Corporate Citizenship.* Without good corporate citizenship, *no* telephone company can obtain the respect and admiration of the public which is so necessary for good public relations. Mr. Post makes suggestions as to how telephone companies and their employes can promote good citizenship.

Mr. Post is a native of San Antonio and a graduate of Southern Methodist University in Dallas. He has worked in the advertising department of the San Antonio *Light*, as news editor of Radio Station KPAT (Pampa, Tex.), and was managing editor of the Alice (Tex.) *Daily Echo* prior to joining the public relations department of General Telephone Co. of The Southwest in San Angelo, Tex. in 1954.

Since Apr. 1, 1957, he has been public relations director for The Southwestern States Telephone Co. of Brownwood, Tex., where he directs

(Continued on next page)

both the advertising and public relations programs of this company in its 160 exchanges in Texas, Oklahoma, Arkansas and Louisiana.

Mr. Post is president of the Brownwood Civic Music Association, vice president of the Texas Public Relations Association, vice president of the Brownwood Presbyterian Men of the Church, chairman of the Local Public Relations Committee of the Texas Manufacturers Association, a director of the Brownwood Kiwanis Club and a member of various committees of the Brownwood Chamber of Commerce and the West Texas Chamber of Commerce. He is a member of the Advertising Committee of the United States Independent Telephone Association, and is on the Convention Planning Committee of the Texas Telephone Association.

"T.O.P. (TRAFFIC OPERATING PRACTICE) TOPICS"

WITH THE increasing adoption of Direct Distance Dialing, DDD, and other new telephone operating techniques, we have received numerous requests from medium-sized and small telephone companies for articles explaining and discussing the new traffic operating methods and procedures made necessary by these new advancements.

TELEPHONY is indeed fortunate in obtaining the services of Mrs. Burnett to prepare such articles as she has had long traffic experience as operator, supervisor, instructor, and chief operator.

There will be six articles in the series and Mrs. Burnett has presented the following outline of the subjects that will be discussed:

I. The Anatomy of Toll Tickets.
   - A. Legibility and placement of entries.
   - B. Necessary call details.
   - C. Use of coded reports.

II. What's New on Public Telephone Calls.
   - A. New method on shortages and overcollections.
   - B. Federal tax entries.
   - C. Part-charge tickets.

III. Another Change—Another Step Toward Better Services (WH Practice).
   - A. Elimination of TX position.
   - B. New phraseology on delayed reports.
   - C. Disposition of tickets.

IV. Let's Help Our *V.I.C.'s.
   - A. Improving service to PBX Customers.
   - B. Educating the PBX users.
   - C. Follow-ups.

   *Very important customers—PBX.

V. Simplify Your Clerical Chores.
   - A. Know what.
   - B. Know how.
   - C. Know when.
   - D. Know where.

VI. Rounding Up The Strays.
   - A. Unusual calls.
   - B. Some tricky practices.
   - C. Help yourself to some good service.

Mrs. Burnett is traveling chief operator for The Southwestern States Telephone Co. of Brownwood, Tex. She began her career in telephony in 1930 when she was employed by Southwestern Bell Telephone Co. in San Antonio, Tex. She served as operator, supervisor, and instructress for the Bell company in San Antonio and Corpus Christi, Tex.

WINNIE B. BURNETT

Following that she was employed in a civil service post as chief operator at the Naval Air Station at Corpus Christi, having under her supervision the Naval Communication Telephone Offices at Kingsville, Beeville, and the other Naval air fields in the Corpus Christi area.

Later Mrs. Burnett became chief operator at San Marcos, Tex., for the San Marcos Telephone Co. She was employed in that capacity when she joined The Southwestern States company in 1953, as traveling chief operator.

In addition to her work, Mrs. Burnett participates in numerous other activities. She is on the Traffic Committee of the Texas Telephone Association. In March of this year, she was named president of the Texas Chapter of Independent Telephone Pioneers Association, becoming the first woman ever to be named head of a Pioneers chapter. She is a member of the Brownwood Chamber of Commerce.

Mrs. Burnett is a past president of the Business and Professional Women's Club of Brownwood and is legislative chairman for the club. She also serves as chairman of the co-ordinated legislative steering committee for the club.

She is chairman of the public relations committee of the Altrusa Club in Brownwood, and is teacher for the Business Women's Sunday School Class at the First Christian Church of Brownwood.

A B C of the Telephone

by Frank E. Lee

SOME FOLKS say the stringing stage in open wire line construction is the magic stage. Up to this point the construction job has been one of planning the line, setting poles, placing anchors, rigging crossarms, and similar tasks. These parts of the job must be done first. However, the result, up to this point, is little more than an orderly group of poles appearing where there were no poles before. These comments are not meant to minimize any part of the job, as all parts are important to a sturdy, long-lasting, low-maintenance open wire line. However, the line really starts to take shape when the steel or copper wire goes up. Then the job starts to move and—as if by magic—span after span and mile after mile of wire is raised, pulled to the correct sag and tension, and tied to the insulators.

Yesterday, the line was a monotonous assortment of starkly naked individual poles under the umbrella of the sky. Today the wire is placed and the line is born. The result is an individual line tailored to fit the needs of the area it serves. This indeed is an exciting part of the telephone story.

This is also a time when the line wire may be subjected to many unusual stresses and strains. Any one of these unusual conditions could change wire stringing from a safe work operation with a happy ending to a serious accident with the possibility of a most unhappy ending.

As with practically any other job in the telephone industry, injuries can result from unsafe practices. Placing aerial cable presents certain hazards that are peculiar to that specific job. There are certain hazards peculiar to plowing in buried cable, and the placing of open wire is no exception where consideration of safe methods is concerned.

The first consideration on any job is to prevent injury to people. The linemen and all members of the construction crew are closest to the various work operations, and as a result they are most subject to accident or injury. People along the right-of-way also may be injured if the job is not planned properly or done safely.

Good planning and careful completion of the various work operations can also keep property damage to a minimum. This includes damage to equipment, vehicles, and structures along the right-of-way, as well as damage to the wire and pole line.

Building an open wire line—from the standpoint of safe work practices—is no different than doing any other telephone construction job. Poles, wire, and hardware used on the line cannot injure by themselves unless they are mishandled or misused by the workmen. Typical hazards of placing open wire are as follows:

(1) The wire may flip up and become entangled with power lines, causing severe electric shock or burns.
(2) People or structures may be struck by the wire being pulled into position.
(3) Wire may be damaged by abrasion or unnecessary kinks.
(4) Linemen may be injured by vehicles moving along the right-of-way.
(5) People may be injured by trucks,

Part 93. OUTSIDE PLANT CONSTRUCTION—Section 19. Stringing Open Wire Lines.

Section 1. Planning of additions to outside plant (TELEPHONY, Nov. 17, 1956).

Sections 2, 3 and 4. Pole lines and poles (TELEPHONY, Nov. 24, Dec. 1 and Dec. 8, 1956).

Sections 5 and 6. Guy wires (TELEPHONY, Feb. 16 and 23, 1957).

Sections 7 and 8. Anchors (TELEPHONY, Apr. 27 and May 4, 1957).

Sections 9 and 10. New cable facilities (TELEPHONY, Sept. 14, 1957 and Mar. 8, 1958).

Sections 11 and 12. Fastening aerial cable to messenger strand (TELEPHONY, Aug. 9 and 16, 1958).

Section 13. Application of lashing rods, lashed cable supports, and typical aerial cable arrangements (TELEPHONY, Apr. 25, 1959).

Section 14. Self-supporting cable and wiring at aerial cable terminals (TELEPHONY, May 2, 1959).

Sections 15 and 16. Open wire lines (TELEPHONY, Aug. 22 and 29, 1959).

Section 17. Brackets and crossarms for open wire lines (TELEPHONY, Sept. 5, 1959).

Section 18. Open wire lines—use of insulators, and protection during installation (TELEPHONY, Oct. 17, 1959).

tractors, and other vehicles used to build the line.

These hazards are not peculiar to open wire alone. This is one of the most important points to consider. The sooner a person accepts the idea that safe work operations make a safe job, the safer the job will be. In installing open wire, it is important to recognize the hazards and then take the precautions that will eliminate the hazards.

What Causes Wire to Flip-up?

Certain forces are in motion when an open wire is being pulled or unreeled along a pole line. The pulling force along the run pulls the wire along the line from pole to pole. The force of gravity pulls excess sags in the spans as the wire is stopped and raised into position on the crossarms. A flip-flop occurs when this basic arrangement of forces is upset. The result can be demonstrated with some typical examples of cause and effect.

(1) Assume that the wire reel jams or a tangle occurs to prevent wire being paid out as the pulling force is applied. The pull on the immovable wire will quickly pull the slack out of the excessively sagged spans. The wire will snap upward. Inertia will carry the moving wire higher than the height of the crossarms. This is a flip-up. A cross with high voltage power lines could occur if the wire is being placed on a joint use pole line. A typical flip-up in several spans of the line caused by a sudden start after the pulling operation was stopped temporarily is illustrated in *Fig. 1.*

(2) Perhaps a wire being pulled up to correct sag and tension may become caught in a bush, tree branch, fence, or similar structure. A greater upward pull is placed on the span as the horizontal pull continues along the line. The pull along the line increases until the line suddenly pulls free. The wire snaps upward, flips up, and a serious cross with high voltage may result. A flip-up confined more or less to a single span, caused when the wire is caught in a bush, is shown in *Fig. 2.*

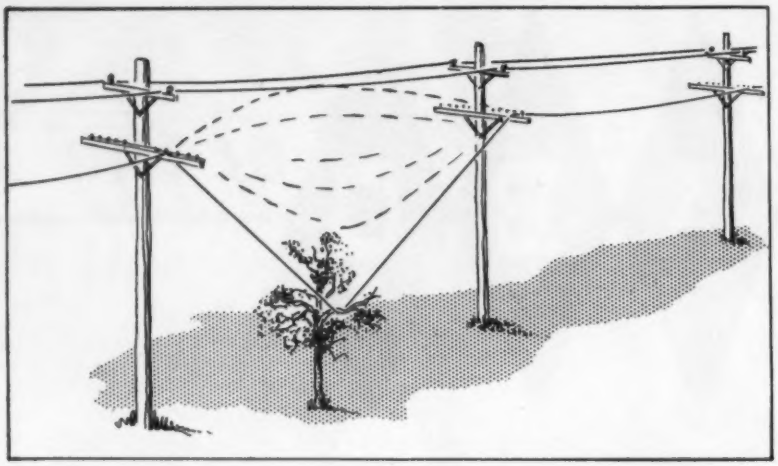


Fig. 2

(3) Consider what might happen if a wire is cut, broken, or slips from a pulling grip while being pulled to tension. The end is free and tends to coil up. The tension of the line pulls the end back along the line. The pull, plus the coiling action of the wire, will flip the free end into a wide, erratic arc. No one knows where the free end will travel as the tension is released along the line. This also could result in a flip-up and a cross with power wires.

The chances of a wire being cut accidentally, slipping, or being broken, are considerably less than flip-ups being caused by either of the first two examples. The best prevention is careful handling of the wire to prevent accidental breakage.

A little caution and attention to all spans in the section being pulled into position will prevent flip-ups from wire becoming caught in an obstruction.

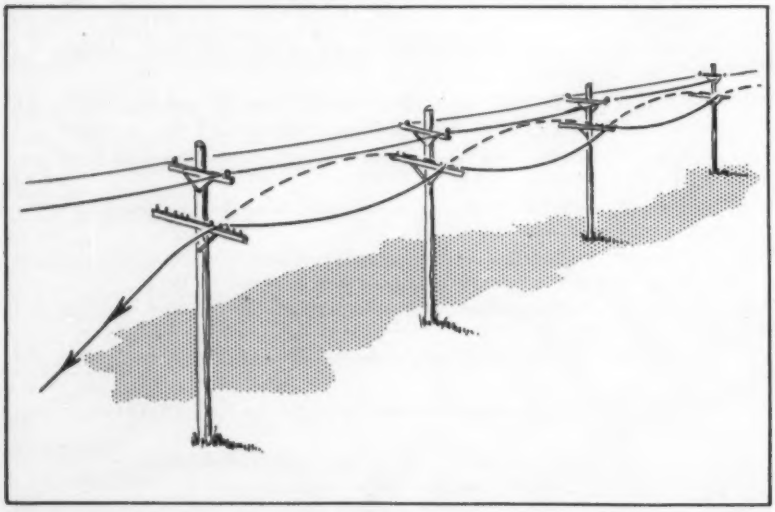


Fig. 1

Snarled or jammed wire reels can be prevented by keeping a careful watch of the reel (or reels) as the wire is being pulled along the line. Walkie-talkie radios, flag signals, and similar intercommunicating systems can be used to maintain close coordination and control at all points along the line as the wire is being pulled into position.

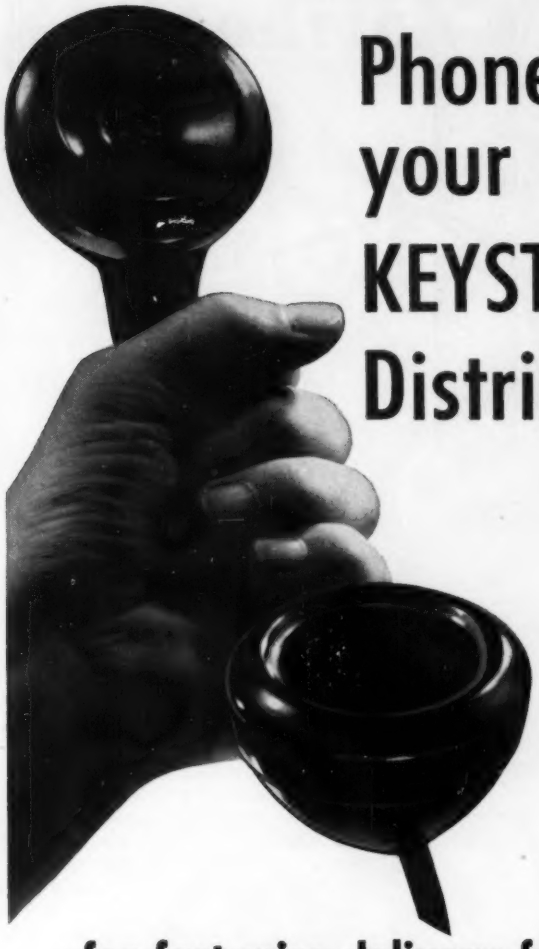
Handlines or wire raising tools can be used to hold the wire clear of any obstructions under the pole line. This will enable the wire to be pulled into position without snagging any span.

The pulling operation should be as smooth as possible. A little extra care to avoid sudden starts and stops while pulling the line into position will pay big dividends. Sudden stops and starts can foul the reels, tangle the wires being placed, and in general will create extra work in clearing the lines. Sudden starts or stops or unnecessary tugs or pulls can cause a wire to whip or flip.

Linemen who handle the wire—either on the ground or on the poles—should wear rubber gloves while the wires are being strung or tensioned on joint use pole lines. This is a good precaution, too, if the line crosses under a power line.

All bodily contact with the wire, guy strands, and other metallic parts of the pole line should be avoided if rubber gloves are considered necessary. The rubber gloves protect only the hands and forearms. Keeping the body clear of the wire and other metal parts eliminates the chance of contact with any energized part of the line.

A little extra care in handling the wire will add to the trouble-free service life of the completed line. Handle the wire to prevent abrasion, kinks, nicks, and sharp bends. A pole line usually is built to provide service over a long period of years. Considering the cost



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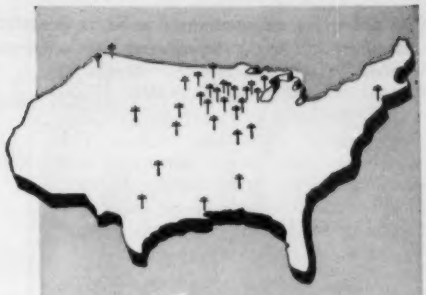

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of a few extra moments used to prevent damaging the wire during installation is about like comparing the value of a few seconds with a year's time. Generally, the wire is easier to pull into place when it is handled carefully. The conditions that cause abrasion and kinks make the wire harder to pull. This is another instance in which the best way to do the job is the easiest way.

A rather large wire (such as open wire) has a tendency to recoil or spring back after being cut. This could cause an eye injury, puncture wound, or a painful skin abrasion. The safe way to cut the wire is to hold ends of the cut section to keep them under control. This can be done easily with one hand while the wire is cut with the other. There actually is very little movement of the cut ends when they are held under control. This might cause a person to discount the potential hazard of allowing the wire to fly free after being cut. However, uncontrolled ends are a potential hazard and should be treated as such at all times.

Stringing Wire on Small Job

Wire is easiest to handle when pulled directly from a reel. However, reels are not necessary for small jobs consisting of placing two wires for a few spans. One lineman can pay out the wire from a coil while a second lineman pulls the wire along the ground. A wire raising tool, or a similar tool, can be used to lift the wires to the crossarm.

Sometimes the wire cannot be pulled out along the ground, even on a small job. The wire can be pulled along the crossarms, similar to pulling wire on a large job, where these conditions occur.

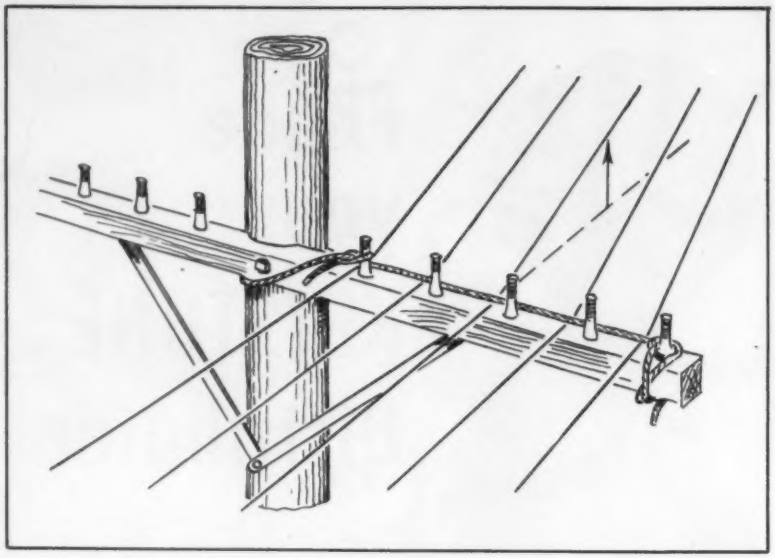

Fig. 4

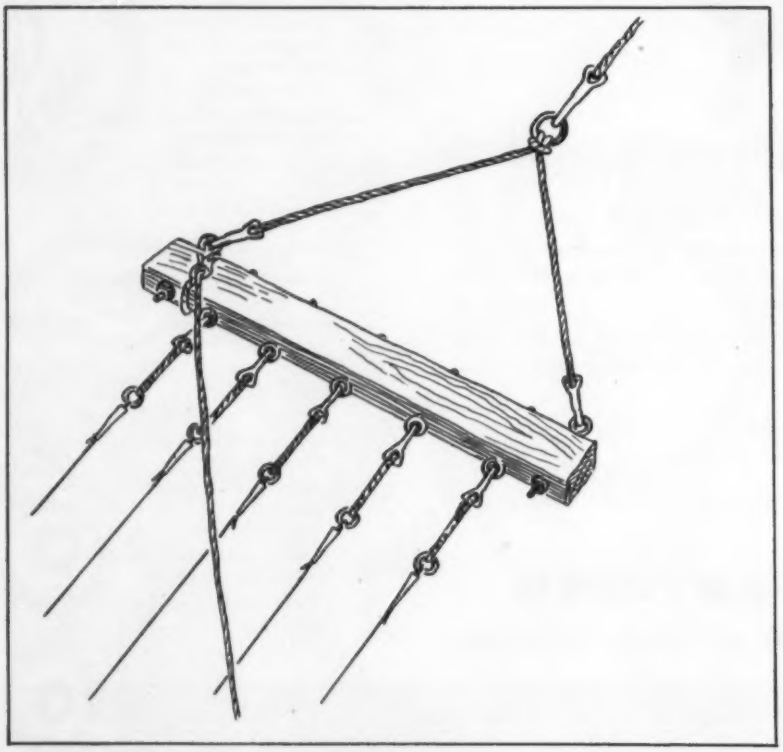

Fig. 3

Stringing Wire on Large Job

Stringing wire on a large job is greatly simplified if the wires can be pulled along the crossarms. All of the wires on a single crossarm usually can be pulled at the same time.

A typical pulling board for five or less open wire lines is illustrated in *Fig. 3*. This pulling board can be made from a 2 inch by 4 inch piece of clear hardwood about 18 inches long. Five eye-bolts are provided for the open wires. An eye-bolt on either end permits easy connection of a manila rope sling. A short length of rope with a ring at one end and a bolt snap hook at the other may simplify attaching open wires to the board. A guide rope extending to the ground will help keep the board under control.

A long tow line can be snapped onto the ring in the center of the rope sling. The tow rope should be about two normal spans in length. This permits pulling at a long angle when the rope is placed over the crossarm of the next pole along the line.

A typical span may be pulled as follows:

(1) Set up the reels at a convenient point ahead of the first pole in the pulling section. The longer the angle of the wire as it passes over the first crossarm, the less strain there will be on both the wire and the crossarm.
(2) Rig the pulling board and pass the tow line over the first crossarm.
(3) Pull slowly and steadily on the tow line. Be sure the reels are tended and are operating against a brake or drag to eliminate the tendency to over-run when the pull stops.

(Continued on page 76)

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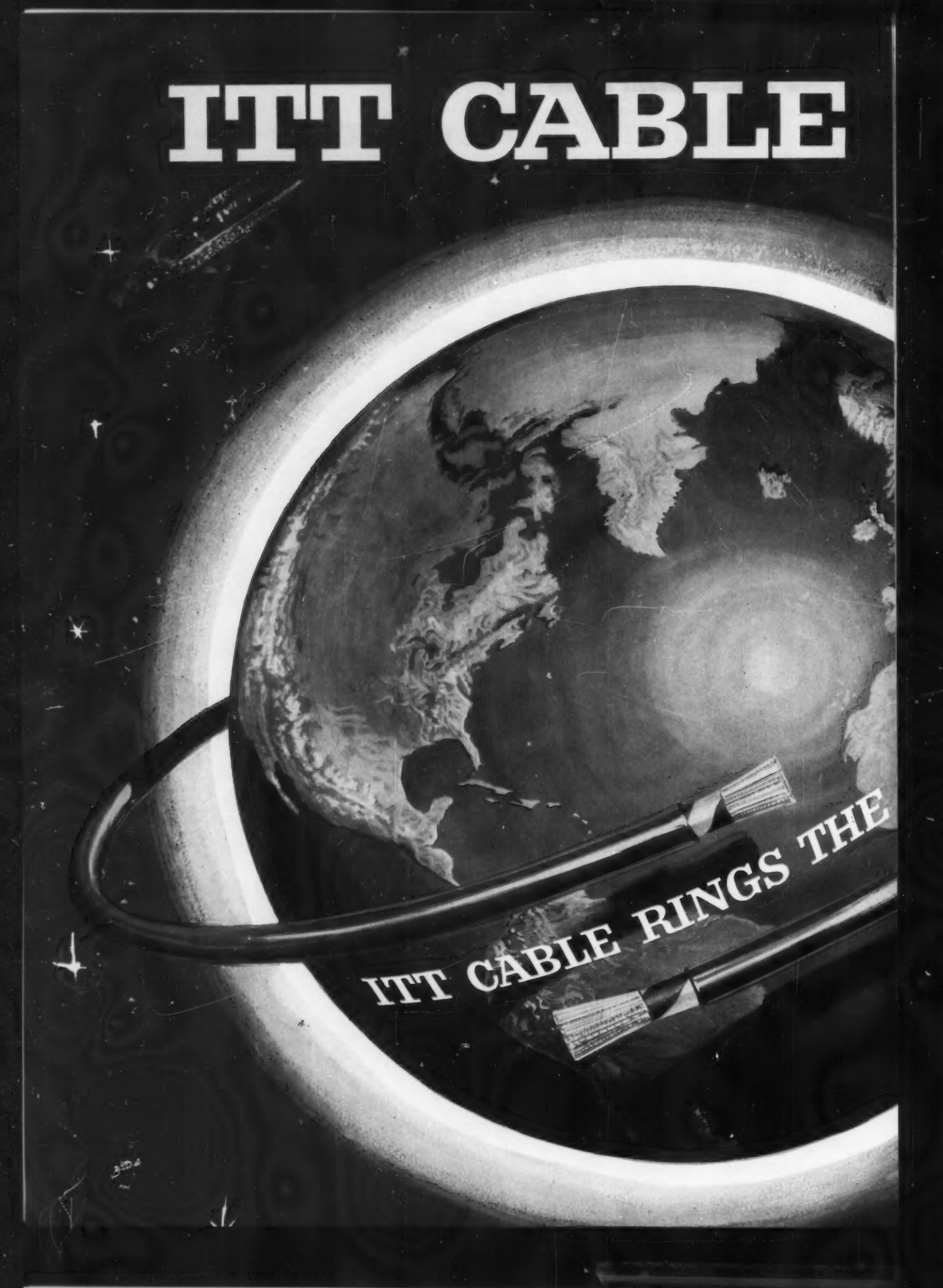
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Capacitance Unbalance 900 cycles A.C., micro-microfarads	*	*	at 22 AWG: up to 1000′—100; 1001′ to 2000′—150; 2001′ and longer—200 at 19 AWG: up to 1000′—100; 1001′ to 2000′—150; 2001′ and longer—200	
Dielectric Strength: 60 cycles A.C., for 2 sec., volts rms				
conductor-to- conductor-to- sheath	355	355	355	500
core-to- sheath	850	1000	1000	1000

Insulation Resistance: not less than 1,000 megohm-miles at 60°F measured with a D.C. potential of 100 to 550 volts.

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pr public relations in the Telephone Business

. . . THE GENERAL CONCEPT

BY R. L. POST*

IT WAS REPORTED recently that nearly three quarter billion dollars are being spent annually in the United States on Public Relations (PR), exclusive of straight advertising. Over 100,000 people are said to be employed in direct public relations work.

Why are so many people spending so much money on PR?

Perhaps because some businesses think that public relations is something magical, something that—hokus, pokus—"manipulates" the public and thus can make them more money, heals all wounds, and puts out all the fires of criticism despite management concepts that ignore the public interests.

It is more likely, however, that the big interest today in public relations stems from a vital realization that no business can exist and stay in operation in this day and time without the approval of the public. If this is true, public relations becomes a creed you live by, an attitude of mind, something within you that you live with 365 days out of the year.

This is especially true in the telephone business.

Four Words Forerunner

Some say, jokingly, that the art of public relations was born when Eve sold Adam on the advantages of apple cobbler. She was a persuader, of sorts, which is the term some novelists use for PR people.

To be more realistic, it might be said that public relations came into its own as the result of four words spoken at the turn of the century.

These history-making words were uttered by Commodore Cornelius Vanderbilt, who, announcing curtailment of train service between New York and Chicago, was asked in a press conference:

"Commodore, isn't this going to cause serious inconvenience to the public?"

That's when the Commodore blew his stack, turned purple, and uttered the now famous phrase:

"The public be damned!"

It would be hard to trace the effect of these words on the public relations concept in business and industry today—but there's little doubt but what they dramatically demonstrated that a "public be damned" attitude is a pretty fair antonym for public relations.

Attitude Disastrous Today

In the telephone business, such an attitude or public pronouncement would truly result in disastrous holocaust today. The telephone company cannot stay in business very long today without public approval.

Every telephone company has seen in recent years how the public can show their reprisal if they don't approve of the way the telephone company is running its business. They can retaliate by passing laws that restrict or hamper telephone operations. They can see that unjust taxes are levied against the telephone company. And, even more dramatically, they can exert pressures to see that adequate rates are denied, thus hurting the telephone company earnings. By the same token, the public can bring about show cause orders from commissions to show why telephone rates should not be reduced.

How can the public show approval of the telephone company?

They can exert pressures that can result in:

(1) Granting adequate rates, through an understanding of the earnings problem of the business.
(2) Generating a good business climate in which the telephone company can operate without undue penalties such as unfair taxation.

To gain this public approval requires a vigorous, active public relations program.

Management Function

Public Relations News, the bible of the PR industry, defines public relations as the "management function which evaluates public attitudes, identifies the policies and procedures of an individual or an organization with the public interest, and executes a program of action to earn public understanding and acceptance."

If a company considers public relations as a management function or management concept, then public relations directly or indirectly enters into every major management decision and policy. It transcends departmental lines. If the general policies and actions of a telephone company are not in the public interest, no public relations program will cure its public relations ills. It is

*Mr. Post is Public Relations Director of The Southwestern States Telephone Co. of Brownwood, Tex.

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important to remember that the PR concept must be instilled in the top management of a company before the company can hope to set up an effective public relations program.

PR Part of Creed

Once management realizes that the PR concept must be kept in mind in every management decision and policy, then PR will become part of the management creed or philosophy of doing business. Most written company creeds include "public interest" as a factor as well as the moral and ethical aspects without which no business could survive.

The telephone company with a proper PR concept will recognize more fully its service responsibilities. Poor telephone service brings poor public relations, and no amount of advertising or public relations activity can make bad service acceptable to the public. Rendering good telephone service is the first and most important prerequisite to good public relations.

The PR concept in management also affects the treatment of the employe group. With public relations in mind, management decisions will place in better perspective the importance of fair treatment of employes in running the business. The telephone business, despite mechanization, still depends upon humans to provide the service which makes it imperative that management take into consideration the feelings, aspirations, desires, and needs of its employes in making management decisions.

Shareholders Important

The telephone company has a third "public" to which the PR concept must be applied if the company is publicly owned and there are shareowners in the business.

The PR concept in management of the business must come first. Once the policies and procedures of the telephone company are aligned with the public interest, the next step is to implant in the employe of the company the seeds of public relations, with management fully realizing the importance of the actions of the employe, both on and off the job, in developing the good reputation—or public relations—of the company.

The power of the spoken word by an employe is underestimated by many telephone companies.

According to statistics released recently by one of the leading opinion research firms in the country, employe opinion of a company and community opinion of a company is parallel in nearly every instance, regardless of type or size of business, part of the country, or any other factor. The reason for this is that most of what a community knows about a company it finds out from contact with employes of that company. The public forms its opinions of a company and learns about the activity of a company mostly by talking to employes of the company, both on and off the job.

Employe Must Be Informed

What does this mean to the telephone company?

It means that communication with employes takes on increased importance because of the PR implications. The employe must be informed—not via the grapevine, but by the telephone company.

One survey of the employes of many companies showed two chief complaints: Management doesn't share (the profits with employes), and management doesn't care about the welfare and feelings of the employe group.

If any of your employes feel that way about your telephone company, you can be certain that such attitudes are contagious and that your "public" will soon be infected with the same malady.

Not only is it important that employes talk favorably about their company, but their actions, both on and off the job, also contribute to the good or the bad public relations of your company. Their personal behavior and habits as well as their citizenship reflect upon the telephone company.

In the next article, the subject of employe information, as one of the first steps toward better public relations, will be discussed.

Three Loans Approved by REA

Telephone loans approved during the third week of November, by the Rural Electrification Administration were as follows:

Northeast Louisiana Telephone Co., Collinston; $71,000; Nov. 17.

The loan will help the company furnish initial service to 168 subscribers in the present service area.

REA loans to this borrower now total $300,000 which will enable it to provide new and improved service to 666 subscribers. The completed system will consist of exchanges at Bonita and Collinston which are now in operation and furnishing dial service to approximately 480 subscribers.

Ben W. Hopgood is president and manager of the Northeast Louisiana company.

•

The Paul Bunyan Rural Telephone Cooperative, Bemidji, Minn.; $734,000; Nov. 17.

The company plans to improve service for 608 subscribers and to furnish initial service to 372 other subscribers. The subscribers who will get improved service are now served through manual telephone facilities of nine small companies and nine switching service lines which the borrower plans to acquire and integrate with its system.

New dial central offices will be constructed at Northome, Solway, Squaw Lake and Turtle River.

A portion of the loan will be used to acquire and remodel a building in Bemidji for headquarters use, and to complete the authorized system.

Loans to this borrower, now total $1,122,000, which will enable it to furnish new and improved service to 1,596 subscribers. The completed system will consist of six exchanges, two of which are now in operation.

William J. Dunlap is president and James R. LaMont is manager of the Paul Bunyan cooperative.

•

The Dobson Telephone Co., Stillwater, Okla.; $501,000; Nov. 17.

These funds will enable the borrower to improve service for 571 subscribers, and furnish initial service to 115 subscribers in Oklahoma and Texas. The existing subscribers now receive manual service from the Leedey (Okla.) Telephone Co. and the Reydon (Okla.) Telephone Co. which the borrower plans to acquire and integrate.

The Stillwater company will construct new dial offices to replace existing facilities in both exchanges.

REA loans to the company now total $716,000, which will benefit 1,048 subscribers. The completed system will consist of four exchanges.

E. R. Dobson is president and R. L. Dobson is manager of the Dobson company.

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For even greater versatility, the PM-30-55 "Pole-Master" is equipped with a head sheave which extends 56″ hydraulically. Maximum derrick height is 26′—easily handles 55′ poles. The PM-30-40, with fixed head sheave, has a maximum height of 21′ 6″ and is designed to handle 40′ poles. Underfloor winch line travel is optional.

Make it a point to get the complete story on the work-speeding PM-30 without delay. Details are yours for the asking.

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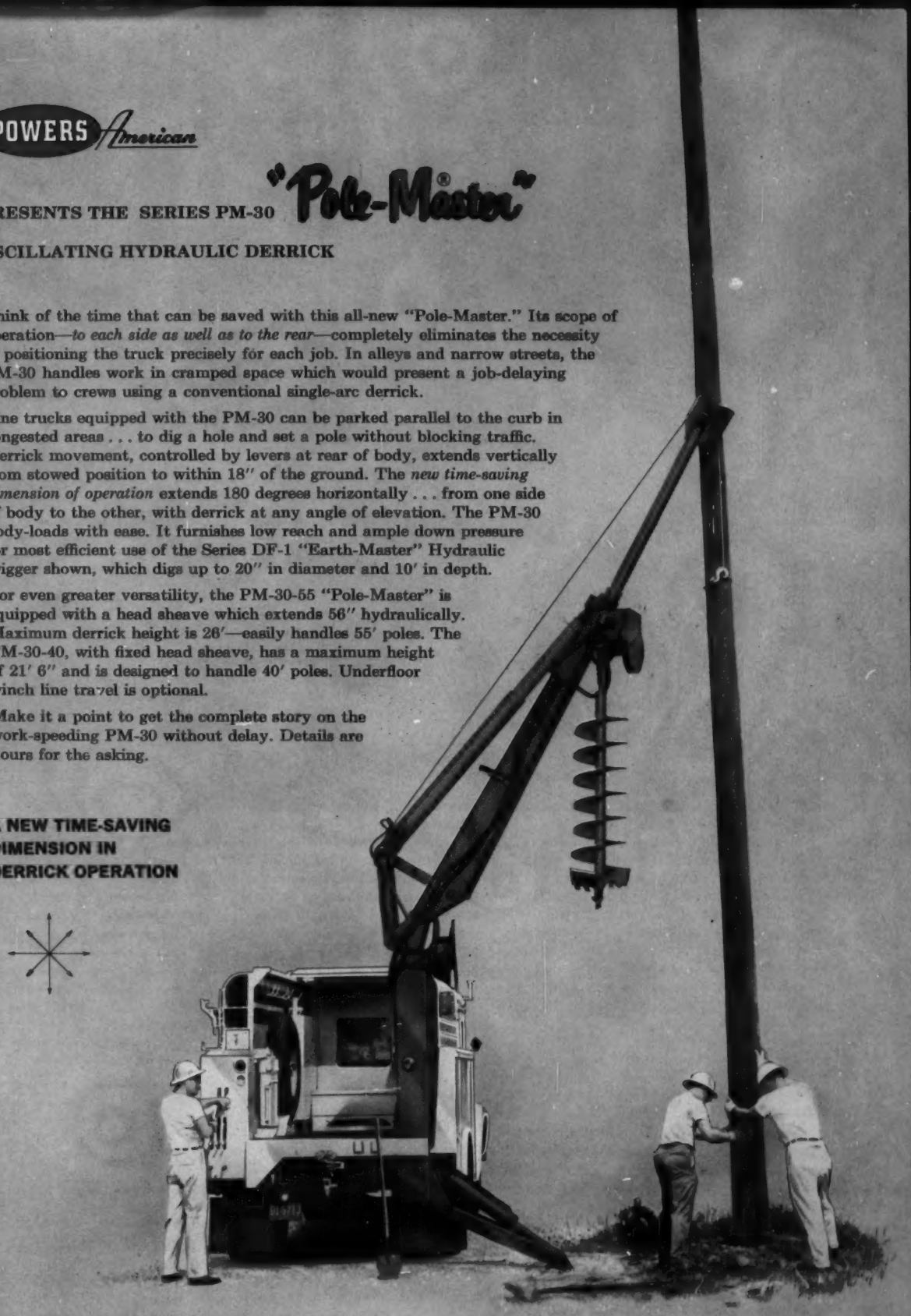

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Answering Device Contributes to Success of Many Businesses

By ALEXANDER I. WARRINGTON*

The Electronic Secretary. (Illustrations, courtesy Leich Sales Corp.)

So-called "service industries" offer telephone companies greatest potential market for these instruments. Should be high on list in selling programs.

WHEN a business telephone rings, it generally means a loss of money if it is not answered. However, there are many types of enterprises that cannot have someone within reach of the telephone at all times. This type of industry is being well served by automatic telephone answering devices which are designed to give and record messages.

In Louisiana there are nearly 1,000 such instruments, with about 150 in the Baton Rouge District.

There is a young lawyer in New Orleans who has made amazing progress during the past seven years and attributes much of his success to his telephone answering instrument.

The lawyer decided that the best way to get a coveted oil account was to spend more time outside of the office in promotional work. Since he could not afford a full-time secretary, he did the next best thing — the installation of an instrument for giving a brief message explaining the necessity of being out of the office and an invitation to the caller to make a statement as to his name and telephone number and other pertinent information.

The young lawyer was able to give good service to items that came over the telephone without being a slave to it. And since he spent several hours daily in trying to convince the oil industry that someone therein needed his skill and talent, he succeeded in securing an account on a retaining basis.

When he was able to afford a full-time secretary, the answering device remained. Even with a full-time secretary, the attorney explained, there are coffee breaks and other things that take a person away from the telephone. With an answering device there is practically no possibility of missing an important call. And there are few calls, the barrister concluded with a smile, that are unimportant. "As for sentimental reasons," he explained, "I am a sentimental realist. If the answering device has created a short-cut to higher earnings, it has demonstrated itself as a wise investment and it will continue as an integral part of my office equipment."

In Baton Rouge, there is a gentleman who is past 80 and who is managing a parking lot and an apartment house with hotel service. For the apartment house he has a housekeeper and several maids. He found that his parking lot business functioned more smoothly when the housekeeper gave a helping hand to the cashier's cage and other items, particularly during the rush hours.

Although the housekeeper was glad to lend a helping hand, she realized that money spent on advertising vacant apartments would be fruitful only if telephone calls were answered. The solution to the problem was through an answering device which also works all day on Sundays and holidays.

As for dentists, there are times when patients require the full and uninterrupted attention of both the dentist and the nurse, and yet the telephone cannot be ignored. During such periods the answering mechanism is a blessing for all concerned. Once used in a dental office, a wide scope of uses is quickly found.

In real estate offices, there is a great deal of appraising and selling that must be done outside of the office and yet calls that come in for listings, purchases, and other things, must be handled. Many operators have found that the telephone answering device pays for

*Mr. Warrington is an Industrial Economist of Baton Rouge, La., and has authored many articles for TELEPHONY during the past years.

a FIRST look . . .

New Airtronics MULTI-PURPOSE, PORTABLE test hybrid set

CHECK THESE SPECIFICATIONS

120 P Repeat coil hybrid, specially adjusted for high trans-hybrid balance

128 type low pass filter

Precision 1% capacity decades on NBO

Internal switching provided for two most commonly used networks

Plug-in network arrangement, compromise net built in

Line and Net simplex leads brought out to pin jacks on front panel for special testing procedures

Convenient panel lay-out, jacks and binding posts to facilitate connection to line or external circuits

600 ohm impedance on 4 wire legs

900 ohm impedance on line, (a built-in switch permits change to 1500 ohm impedance line)

ALSO AVAILABLE

External decade capacitor and variable resistor (3 terminal) for use in locating cable opens, for compromise net, etc.

Plug-in dial to facilitate testing procedures

- **makes acceptance tests easier, faster**
- **locates cable opens accurately**
- **accommodates standard networks**

Now, a completely portable precision test hybrid for transmission engineers and testers — ruggedly built, and packaged for maximum convenience and flexibility. Use Airtronics new Test Hybrid Set for cable and trunk acceptance tests, circuit evaluation, capacity balance tests, acceptance and evaluating tests using Singing Point or Return Loss techniques, plus other specialized applications. Use it, too, to locate — with *Airtronics unique new "Cable Locator"* — some of those "lost" cable pairs currently unavailable for use because of opens! This exciting innovation in telephone test equipment determines, with new accuracy, distance to an open end — by a capacity comparison method, with capacity measured to ±1%.

Modernize — simplify — your testing procedures with the new Airtronics Multi-purpose Portable Test Hybrid Set, Model 20B. It is designed to use standard type 115H or 115AL Precision Networks, available in all toll offices.

another product FIRST from

AIRTRONICS INTERNATIONAL CORPORATION

P.O. Box 8576, Fort Lauderdale, Florida (6900 West Road 84)

itself over and over again. This is particularly true in the smaller office where personnel are at a premium.

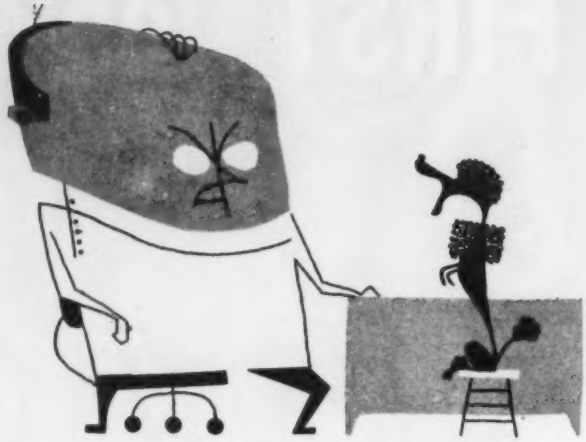
Accountants usually do their work at the office of their clients and are dependent upon the telephone for new and continuing business. To the smaller business accountant, it is quite a task trying to straddle his own office and the office of his client at the same time. A telephone answering device is the solution to many such business problems.

While the larger advertising organizations control the bulk of most types of advertising efforts, the one-man firm is to be found throughout Louisiana. Here again there is the problem of handling incoming calls and promoting business by making personal calls. The agencies who employ the answering device have indicated that there has been a substantial improvement in the volume of business handled that can be traced indirectly to this instrument.

With a telephone answering instrument, the repairman can have more customers with less overhead.

Answering machines serve as a complete replacement or a supplement for human beings and are able to supply complete telephone service for offices that formerly received telephone calls on a hit or miss basis. These instruments fit in ideally with modern automation.

How much more is now accomplished, more or less routinely, in law, accounting, medicine, apartment dwellings and parking lots since answering machines have provided more effective telephone service is a matter of conjecture. Surely those who have this improved service are able to make better guesses. And the guesses of those interviewed ran from 20 to 40 per cent increase in dollar business volume, with the exception of the attorney whose earnings increased from $3,700 to $22,000 in less than seven years.



The veterinarian might not need a full-time secretary with an answering device.

No one would venture to say that the attorney was able to increase his earnings $18,300 per year because he had the foresight to install a telephone answering device. The attorney himself says that the answering machine presented the means of office emancipation that made it possible for him to engage in the promotional efforts that have produced highly satisfactory results.

The answering device cannot create the miracle of a person being in two places at once, but it does go far in that general direction and nearly accomplishes this feat. A person can depart from his office and leave a record of his voice behind him.

There is nothing particularly new about people who suddenly find themselves financially pressed or destitute after being accustomed to a life of ease and luxury.

Until recently there was such a lady in New Orleans who was born on a prosperous sugar plantation and who married a member of the European nobility.

To fully describe the life of this member of the Louisiana aristocracy would probably be good material for a book, but all that will be told in this article is that, when the lady found that she would have to depend on herself for her own support and that of her two young sons, she became a tourist guide.

In promoting this highly competitive work, numerous calls on hotels and organizations that cater to the tourist trade were required. At the same time, telephone calls would have to be received at her residence. The answer to the problem was an answering device.

The lady under discussion sent her two sons through college and maintained a comfortable home in the better residential section of New Orleans. When she was asked what her telephone answering instrument has meant to her she replied that it has been the difference between abject destitution and a life of comfort.

While the examples given in this article probably surpass averages in monetary returns as a direct result of using mechanical means for answering the telephone, there are some highly desirable results to be obtained by making every possible effort to answer the business telephone promptly.

In Baton Rouge there is a service station with one man for the pumps and two for mechanical repairs. This station also makes repairs on power

(Continued on page 88)

While out showing property, the real estate broker can dial his own number and hear a playback of messages recorded on the answering device.

It takes equipment and man-hours to stay on top of telephone maintenance. The more you have in good equipment, the fewer man-hours it requires. Example: this Holan CS-102L Cable Splicer and Maintenance Body—with Ladder.

Here, two men and a truck can handle just about any patrolling, inspection and emergency jobs. The body has lots of compartmentation, special Holan features like the indented door handles and light-but-strong high-tensile steel construction.

The Series 2500 Ladder pumps up quickly to an infinite number of positions, can be elevated and spotted with a man on fully-extended fly ladder. It comes with a duo-level platform.

Write for our cable splicer bulletin—or ask specifically about the CS-102L . . . available with all-hydraulic, manual and pushbutton ladders, too.

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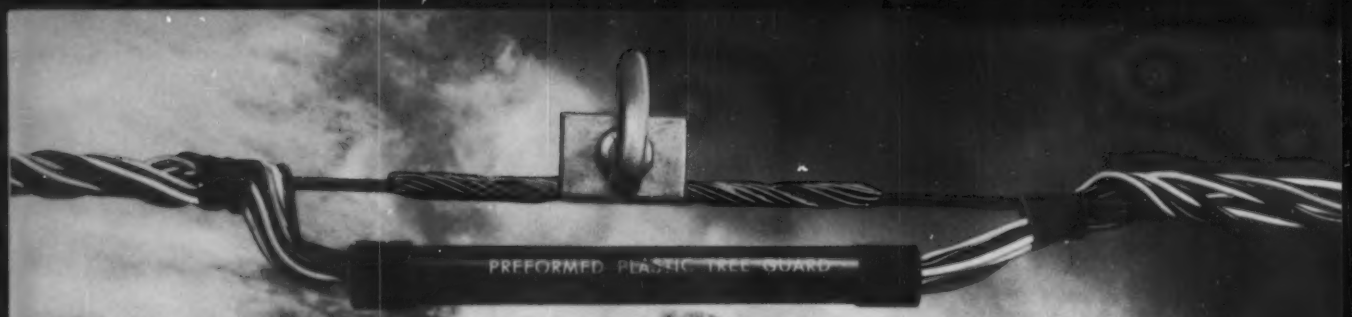

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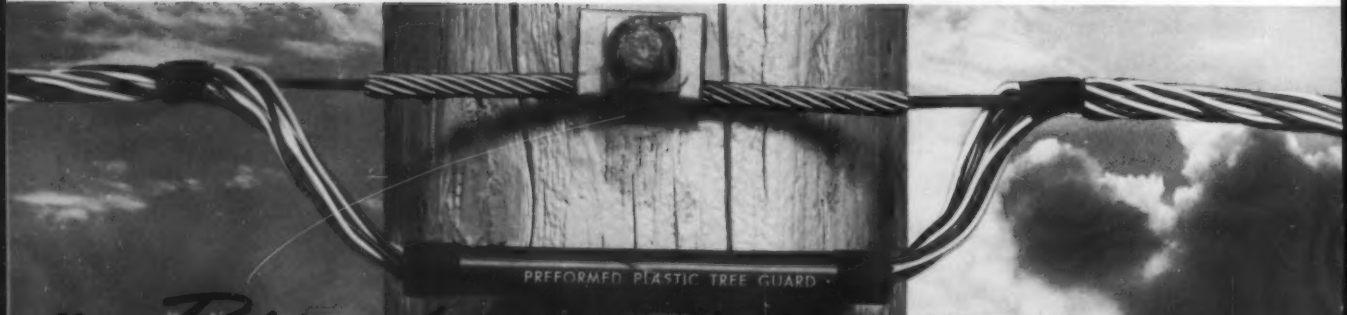
the new way to install service drops and splicing cases. Protective armor increases diameter of messenger to accommodate D Span Clamps or splice case attachments.

Money Saving For Rural



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with one-bolt clamp to avoid expensive J-Hook installations. Armor Rods protect insulated messenger from clamping stresses and increase holding power.

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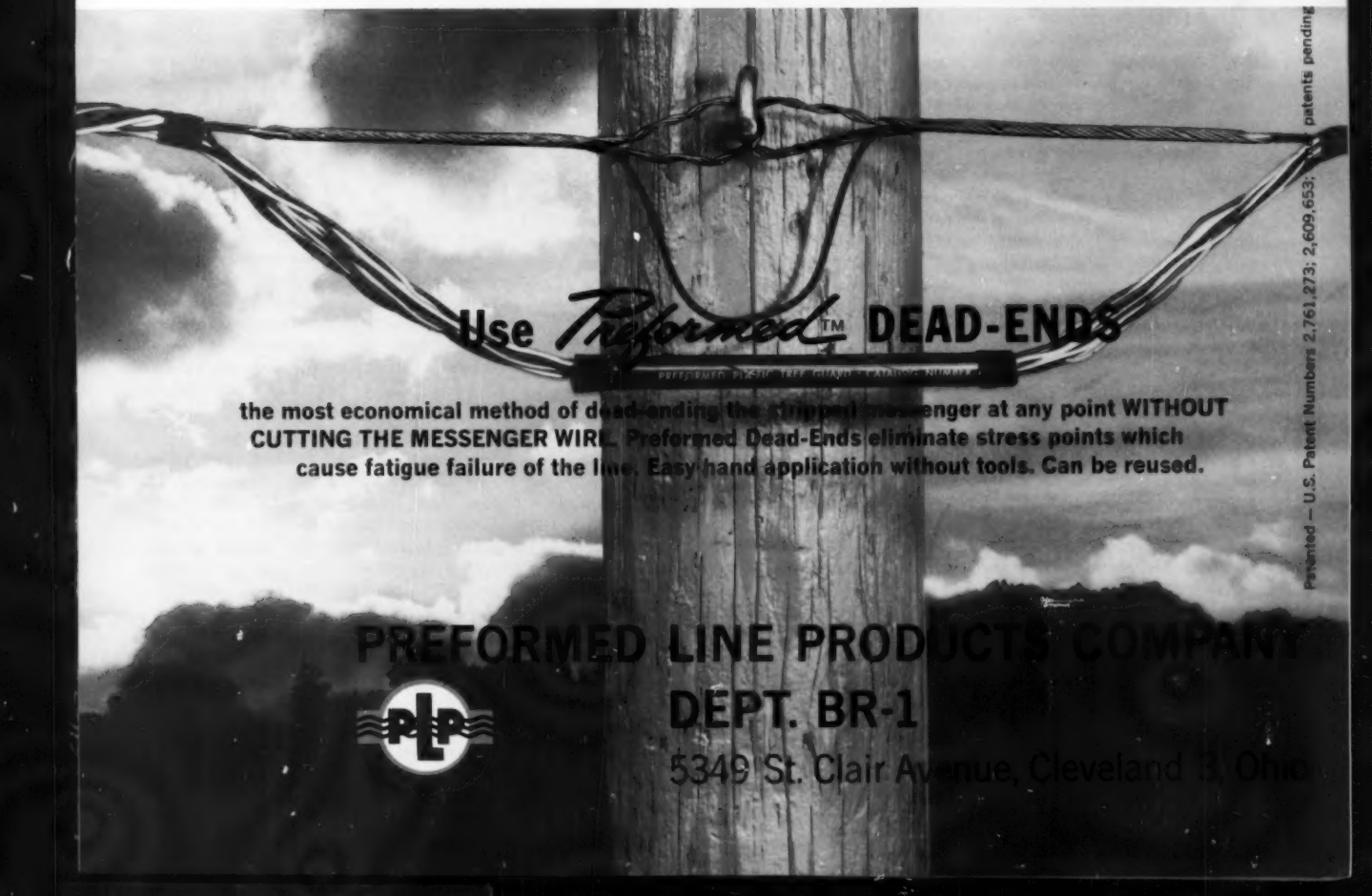
Use Preformed™ DEAD-ENDS
the most economical method of dead-ending the stripped messenger at any point WITHOUT CUTTING THE MESSENGER WIRE. Preformed Dead-Ends eliminate stress points which cause fatigue failure of the line. Easy hand application without tools. Can be reused.
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T.O.P.* TOPICS

By WINNIE B. BURNETT

Introduction

IN THIS modern day of microwave, Direct Distance Dialing (DDD) and the many other almost unbelievable technological developments, it has become imperative that we streamline operating procedures in order that the Traffic Department may keep in step.

Perhaps the word "streamline" is a bit old-fashioned, but whatever the adjective used, the result must speed up operator work by minimizing operating detail. The new traffic operating methods and procedures are designed to do just that—*minimize details.*

Acquiescence Not Enough

Many old-timers in the telephone industry rebel at many of the new practices, after having been thoroughly indoctrinated with such theories as "never cancel a ticket if there is a chance of completing the call." It is difficult to accept *enthusiastically* the drastic departures from the old methods. (Of course, *we* know that canceling a ticket does not necessarily cancel the *call.*) But the time has come when it is necessary to throw out the old and accept the new.

Acquiescence is not enough. The dictionary says that to acquiesce is to comply quietly, or to assent tacitly. This alone will not get the job done, for to be successful, methods must be understood and enthusiastically accepted by management before they can be "sold" to the operating force.

It would seem that management personnel would be eager to accept any changes that would tend to speed up service and minimize operating detail, but all too often top management are the ones who loathe to give up the old ways. New equipment is understood to be a must, but the necessity of changing operating procedures is hard to explain.

Since a big percentage of any company's revenue is derived from completed toll calls, the handling of such calls is of great concern to every department of the company. To insure a successful and remunerative toll program, the Traffic Department must correlate its work with that of the Plant and Commercial Departments, for it is essential to good telephone service that work affecting other departments be clearly outlined, closely coordinated and instructions faithfully followed.

Old Motto Guide

Of course, good service begins with the careful selection and effective induction of employes and continues with proper initial and subsequent training programs. The subject of selection and training of the operating force will be discussed in another article, soon.

The importance of a good tone of service must be stressed and the old "Courtesy, Accuracy and Speed" motto is still the operator's guidepost to good service. Achieve and maintain courteous, accurate and speedy service and the battle of good customer service is won. *But,* good customer service alone does *not* mean a successful toll program has been achieved, unless the company has realized a fair and just remuneration for its service.

New Practices

In order to lessen operator work and circuit time, many new operating practices have been introduced. These practices, if interpreted and followed correctly, not only minimize operator work —they take full advantage of every shortcut offered by modern equipment. But these ideas will *not* work unless *you* do.

Good modern management sweeps overboard outdated methods and theories and welcomes the introduction of new and improved techniques. New concepts are the lifeblood of any enterprise. Maintaining the status quo is not progress — it's just a holding action.

The first installment of this series, which follows, discusses in detail the science of proper structure of our sales slips—the toll ticket. (Part 1 on page 38.)

*Toll Operating Practice

EXPAND AND IMPROVE TELEPHONE SERVICE

with "561" Subscriber Carrier • "541" Negative Impedance Voice Repeaters • "551" Hybrid-Type Voice Repeaters by Stromberg-Carlson

Part 1

THERE is definitely a science in the proper structure of a toll ticket. Since the toll ticket is the sales slip for the Traffic Department, its anatomy is most important.

It is estimated that by 1965 a great percentage of long distance calls will be dialed direct by the customer and the toll messages will be ticketed automatically and billed by this method. This leaves many *millions* of long distance calls to be written on a toll ticket by an operator.

Many offices are converting to "Mark-Sense" toll tickets. In this method, certain details of a call are recorded on a card-like toll ticket by means of a stroke or mark with a pencil containing IBM Electrographic lead, which has the ability to conduct electricity.

The automatic machine accounting for customer Direct Distance Dialing and the mark-sensing methods of operations are giant steps toward the time when complete records of all calls will be automatically taped. However, our particular concern is with the millions of calls still recorded on regular toll tickets.

Three Requirements

To be acceptable, the toll ticket record must be complete, accurate and legible. It is as simple as that. But to meet these simple requirements, a well-conceived and carefully executed program is required, whether your office is a large or small one. To be successful, programming requires, as a prerequisite, a foundation of sound basic training, high service objectives and inspiring leadership. For example, it would be futile to demand or expect that the operators' ticket work be neat, accurate and legible if the chief operator and supervisory force turn out sloppy, haphazard work.

That is the key to good job performance, good training and good leadership, although the work itself is done largely on an individual basis. An operator inspired by the incentive of good leadership will naturally want to cooperate, an attitude that leads to good job performance. And so it goes, each step leading to and strengthening what has gone before and paving the way for the next step.

One of the first technical job fundamentals an operator learns is the preparation of the toll ticket record. Recent changes in traffic operating procedures have minimized the required ticket details to the bare essentials. Certainly, these changes save on operator work time and *they save* on *customer patience* by the total elimination of unnecessary questions.

The minimum information usually required from the customer is the called place and number and the calling number. In some offices, it is not even necessary to have the name of the called place if the customer furnishes the route code and telephone number. In these offices, the Accounting Department accepts the area code and central office designation as a basis for computing charges. The area code identifies the called area and the central office designation identifies the called place.

Entries in Proper Places

The customer should, of course, be permitted to place a call in his own way, but enter only the necessary details on the toll ticket as they are received. All ticket entries must be entered legibly in the proper spaces on the toll ticket. The regular entries should begin to the extreme left of the proper space, unless otherwise designated or instructed. Authorized abbreviations should be used whenever it is permissible.

If the toll ticket has a vertical line in the "No." space, the central office name and/or numeral is entered to the left and the remainder of the number to the right of the vertical line. If there are four or less numerals in the number, enter them all to the right of the vertical. If there is no vertical line in the "From" or "To" number space, separate these details by using a hyphen, as; "CA4-7777" or "8-4066."

If time and charge is requested, encircle this entry in the "Spec. Inst." space and enter the class of call and rate on the back of the ticket in the lower right-hand corner. When the time and charge has been quoted, encircle the charge in the "Charge" space.

If the called place is a Locality point (located at the bottom of the page in the Toll Rate and Route Guide), enter the name of the Exchange Rate Center in parentheses following the called place name if there is room. Otherwise, enter it on the next line or use an asterisk (*) following the called place and another asterisk followed by "(exch. pl. name)" in the space for reports.

Routing Entries

If the called place is a tributary outside the state and not a tributary of your own office, the toll center should always be entered. However, on calls to an intrastate tributary, the terminating toll center need not be entered unless the route is obtained from the route operator. If the customer furnishes the route, or you know the route, or it is obtained from position information, it is not necessary to enter it on the ticket.

It may seem at first thought that a memory route should be entered, because the next operator who works on the call may not know the route. Hence much time will be lost by the necessity of looking up the route or requesting it from the route operator on subsequent attempts. Stop right there! Remember that in this jet-propelled age we operate on the theory that the call will be disposed of on the first attempt.

(If you chief operators are right now moaning about your per cent completed, let me suggest that you concentrate on an all-out effort to complete those calls on the first attempt. That is where *time saved is money earned* and customer satisfaction is insured. The old nagging desire to *hold, hold* a ticket—just to keep from having a CANCEL—just to keep a high per cent completed—doesn't make sense. It is like the old argument of which came first, the egg or the chicken. Why did the fool chicken get in the egg shell in the first place?)

If the call is collect, secure and enter the calling party's name, encircle "col." in the "Collect" space, and if the charge is accepted, encircle the "yes." If the charge is not accepted, encircle the "no." If the calling party will talk and pay for the call, draw a line through "col." and enter "ag pd" in the space for reports. No other entries are necessary—just the coded report "ag pd", and the encircled "col." marked through, give a complete picture of what has happened. Of course, if the charge has been refused and the calling party does not wish to talk paid, the encircled "no" and the "ca" entry at the top of the ticket tells the story. It is not necessary to enter the time with the "ca" entry since it is entered after the report, as; "u today 9-15a."

Codes and Abbreviations

Just as required ticket details have been minimized, the report entries have also been coded and abbreviated to speed up service. To derive the full benefit of the new practices, each operator must be able to recognize what part of the report is necessary to enter on the ticket and she must know how to code such report. And, *all* operators must uniformly understand and follow such practices, else the time wasted in attempting to decode unfamiliar ticket entries thwarts the idea before we get to first base.

One of the most used and abused codes is the code "u," which is the code for "expected." All too often ticket entries will read "u pasture in about an hour 9-00a." An actual translation of this report would be "expected in the pasture in about one hour." That doesn't make much sense, so it is safe to assume that it was not the palomino ponies or Brahma bulls out in the pasture that were expecting the called

(Continued on page 88)

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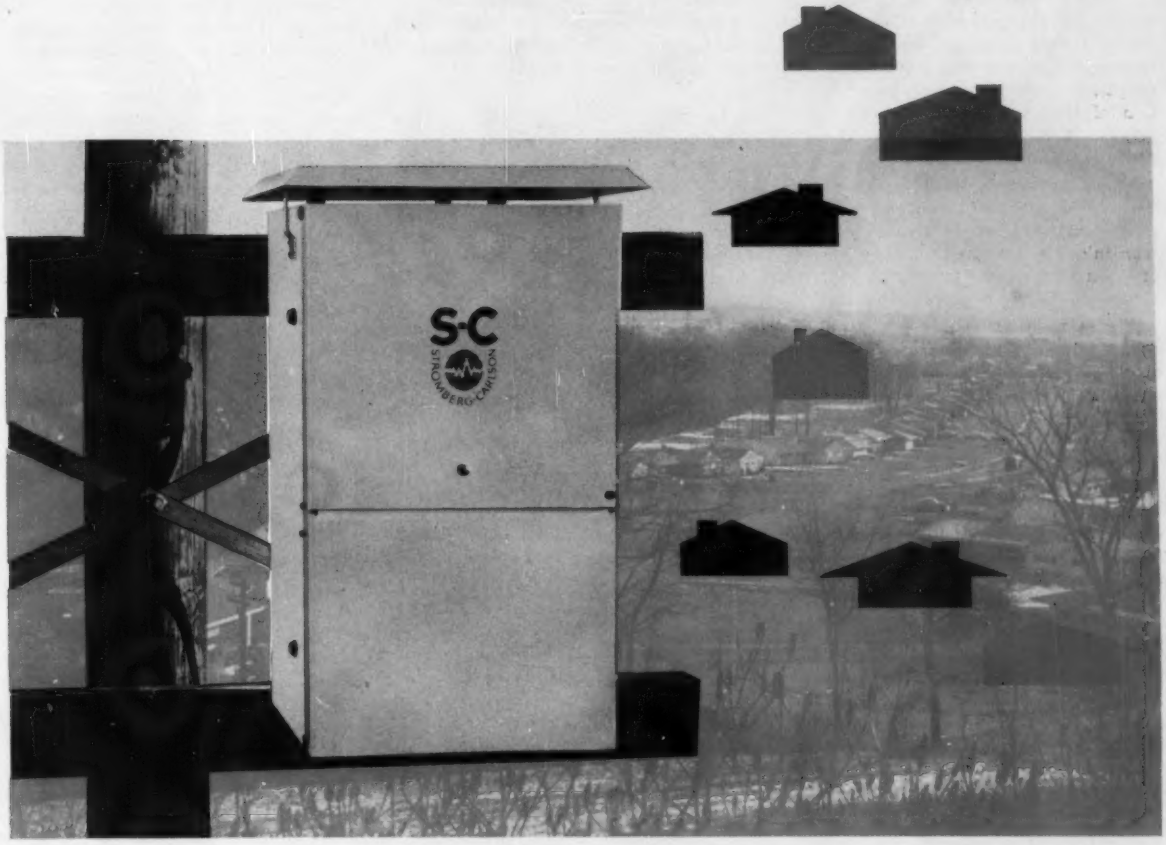

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THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

THE WIRE WRAPPING tool, used to make solderless connections, has been in successful use by the Bell System for the past several years. Now we learn that some Independent manufacturers are seriously considering its adoption. Some may question the adoption of this new method in the Independent field and doubt that it will prove economical.

There are many factors related to the use of the wire wrapping method that have resulted in major over-all economies to the Bell System. Some of these factors may be worthy of consideration by the Independent industry.

A cost reduction study made by the Bell System indicated that an appreciable savings could be realized through the manufacture of the wire spring relay. Wire wrapping was developed as a means of connecting to the new "wire spring" terminal which, of necessity, had no perforation or notch.

Wire wrapping permits closer spacing of terminals than can be used for soldering. This feature makes it possible to place more equipment on a frame. In the shop it costs less to wire wrap than it did to terminate wires by soldering.

The Bell System decided that the termination of polyvinyl chloride insulated wire (PVC) by soldering was not practicable, due to the effect of the heat from the soldering copper on the insulation near the connecting point. With apparatus designed for solderless wire wrapping, the use of PVC-insulated wires has proved satisfactory.

The wire wrapping method also eliminates solder splashes and greatly reduces troubles due to wire clippings. It also eliminates the cost of solder.

•

While in New York City recently we enjoyed a visit with our long-time friend, R. B. Overton, of the Western Electric installation department. We cannot help but marvel at the present day progress that is being made in the development of tools, materials and methods that improve the quality and reduce the cost of communication equipment installation.

•

Constant power is a "must" in the modern telephone exchange to insure uninterrupted service on important units of equipment such as carrier and microwave systems. Several different types of good power inverters are now available for this purpose.

One such unit to come to our attention is a transistorized power inverter that changes battery current to 60 cycle current of the proper voltage to operate microwave and other equipment. This unit is designed to be connected into the microwave ac power source so that whenever the commercial power fails, it will disconnect the "dead" line from the load and supply the necessary power to keep the equipment operating. The time lapse for this sequence is .025 second or 1½ cycles from line failure to full emergency power.

In this type of installation, a standby engine generator would normally be used to take over the load and the inverter would then be used only to fill the gap in power during the time the engine was starting.

In some exchanges, the commercial power is never interrupted for long periods of time and in this case the inverter could be used without an engine generator to back it up. The length of time that the unit will operate is then determined by the capacity of the storage batteries used.

There are some exchanges where even an interruption of ac power for as little as .025 second cannot be tolerated. In this case, the inverter may be operated continually as the prime source of power. The batteries are then "floated" on a battery charger operating from the commercial power lines, and when a failure occurs, the batteries supply the necessary power to the inverter.

This particular inverter is available in 24-volt, 36-volt, and 48-volt dc input. It is rated 1 KVA, 120 volts ac, 60 cycle output. This provides adequate power to operate the average microwave system.

In multiple installations, two or more inverters could be used. Experimental models are now under development up to 5 KVA with transfer relays to operate faster than .025 second. We will tell you more about these later.

•

It is very gratifying to note that Omaha, Neb., and Council Bluffs, Ia., will be among the first large cities in the nation to convert to the new Bell System all-numeral telephone numbering plan. This plan provides for seven digits, rather than the present combination of letters and numerals. There will be no central office names. For example, Northwestern Bell's Omaha telephone number in Omaha, which is now ATlantic 6000, will become 23 1-6000.

All Council Bluffs telephones will be changed to this new numbering system with the coming March, 1960 directory and Omaha's telephones will be changed, effective with the September, 1960 directory. The new numbering plan will also soon be in use in other Northwestern Bell areas.

The decision to adopt seven-numeral telephone numbers will not have any

(Continued on page 70)

"In the Nation's Capital" by Francis X. Welch, our Washington editor, does not appear in this issue as Mr. Welch is recuperating from an operation. His articles will be resumed in the Dec. 12 issue.

"561" SUBSCRIBER CARRIER

Amazingly simple to install and operate

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Careful circuit design results in long life and exceptional reliability.
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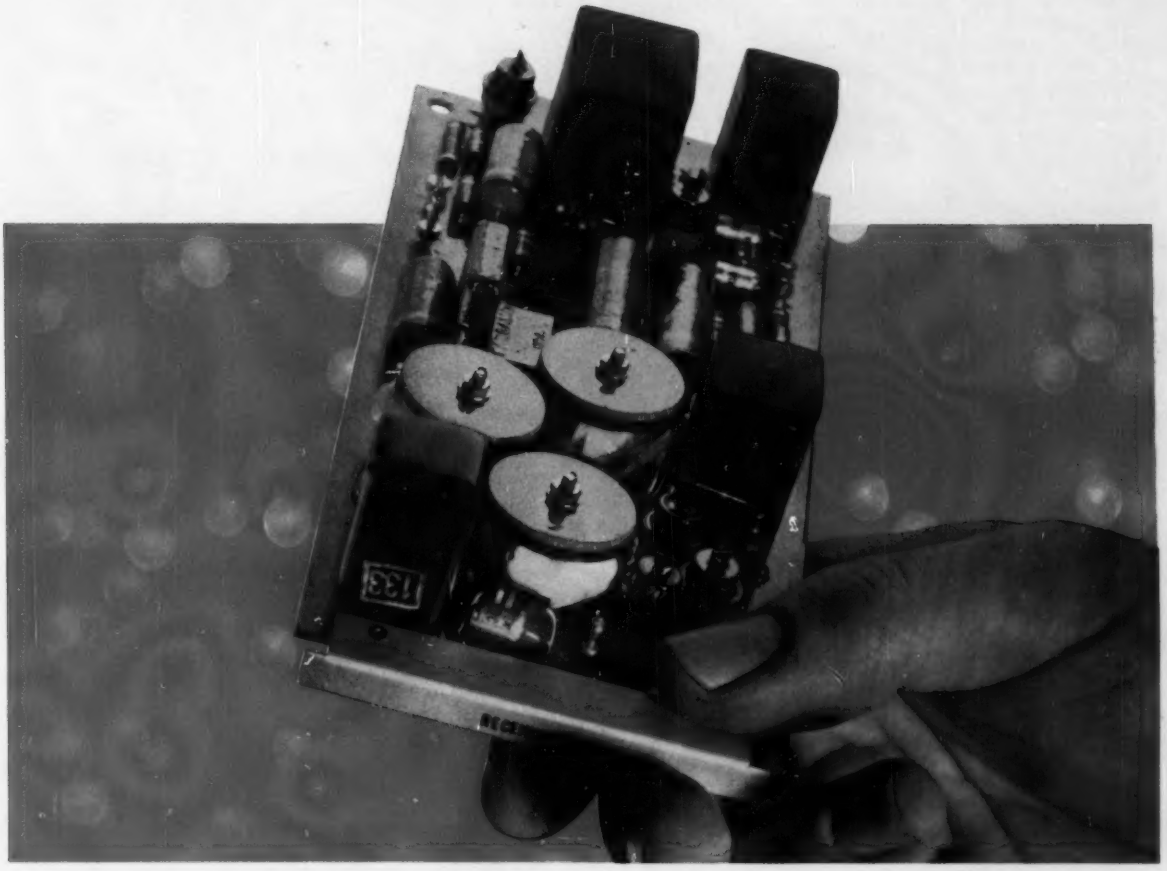

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today's

Highlights

of finance-taxes-business trends

by Willard F. Stanley

BOND PRICES PERK UP A BIT: The four weeks ended Nov. 24 witnessed a moderate pickup in bond prices. Offerings of new issues were few, awaiting the massive AT&T debenture offering. No issues of utility funded debt came to market in the two weeks preceding the 250-million-dollar AT&T issue. Some of the improvement during the above period occurred after the latter issue had been offered. Yield on the AT&T debentures was 5.22 per cent--somewhat higher than the yield on the last previous comparable utility funded debt offering and one-third of one per cent higher than the yield on the AT&T debenture offering in a like amount late in 1957. The latter issue, like the current one, was offered under unfavorable market conditions.

The new offering appears to have been well absorbed, with the debentures selling at a premium above the offering price as this is written. The mild improvement in yields on new bonds is evidenced by the Wall Street Journal's tabulation, which, at Nov. 19, showed a yield on a basis of average bids for nine new utility funded debt issues, nine decimals (0.09 per cent per annum) below the yield based on the average offering prices of the same securities.

With nothing to indicate a "bust" in the business boom, there seems little reason to believe money costs for new utility senior securities will decline substantially from their present high plateau. Nor is there persuasive evidence of a soon-forthcoming drastic further increase in such costs.

Accordingly, procedure along the line of regular schedules for new funded debt offerings seems the indicated course for public utilities. In the area of equity funds, sale by utilities of maximum amounts of common stock to fill equity needs for the moderately near future is indicated by the favorable price-earnings ratios and dividend yields still prevailing, from the standpoint of issuers.

Average price-earnings ratio of some 120 electric utility stocks was shown at 16.7 in the November statistical study issued by an active over-the-counter investment dealer in New York. Their October study showed a comparable ratio of 16.4. Both of these ratios work out to an approximate cost of common stock money of about 6 per cent before deducting expenses of sale, phenomenally low on the basis of history and tradition.

* * * *

STOCK MARKET EDGES UP: An expected "technical reaction" in the stock market occurred during the four weeks ended November 24, following the long and substantial downward slide in stock prices from the beginning of August. Upholding of the Taft-Hartley injunction and consequent return to work of the steel employes was an ingredient in this upward movement. At the close on Nov. 24, the New York Times

(Continued on page 46)

Mr. Stanley, formerly a utility financial executive, is now president of Corporate Services, Inc. of New York City and is well known as a financial writer. He is a member of the Controllers Institute of America and the New York Society of Security Analysts. He serves on the Finance Management Committee and the Tax Committee of the Controllers Institute (N. Y. Control). His articles are appearing once a month in TELEPHONY.

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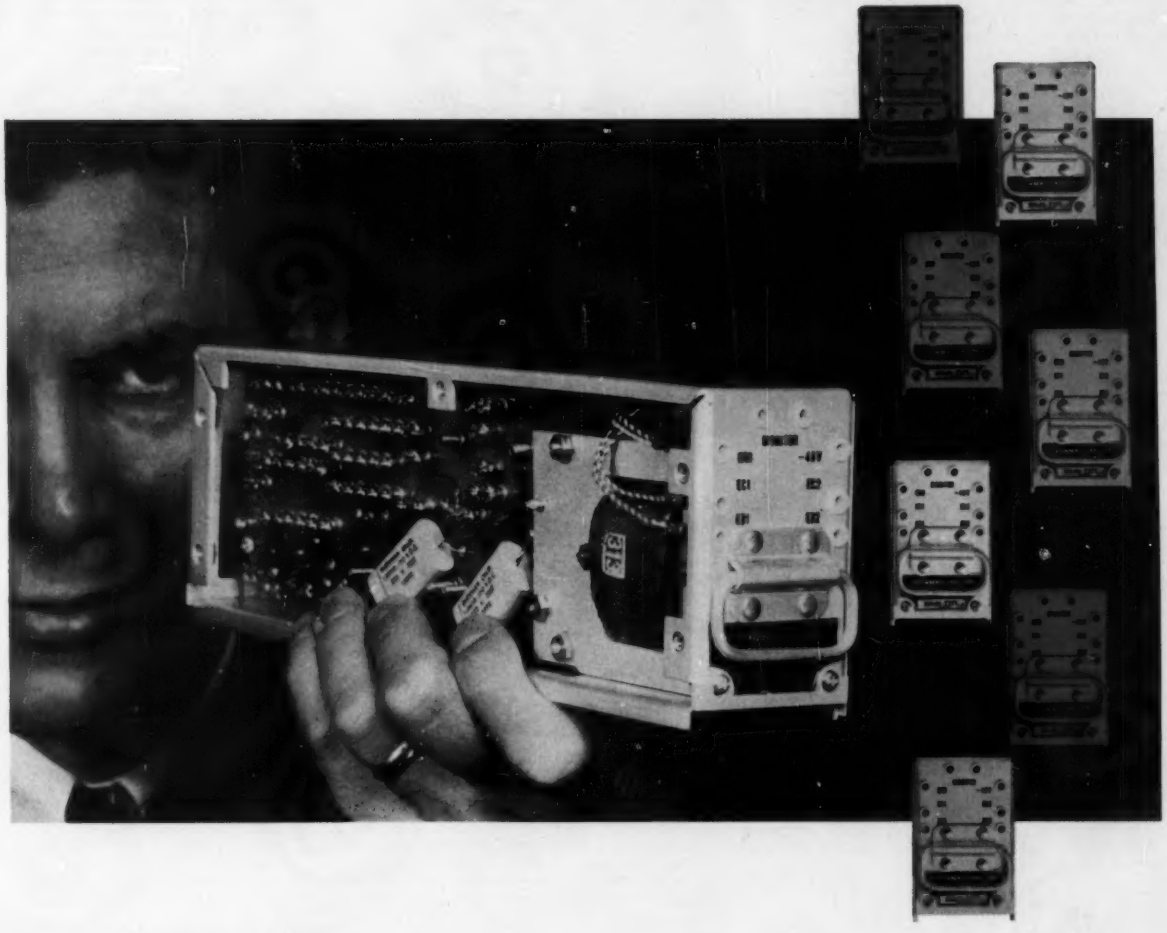

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ATLANTA: TRinity 5-7467 • **CHICAGO:** STate 2-4235 • **KANSAS CITY:** HArrison 1-6618 • **ROCHESTER:** HUbbard 2-2200 • **SAN FRANCISCO:** OXford 7-3630

NORTHEAST ELECTRONICS CORPORATION
PRECISION MEASURING EQUIPMENT and AMPLIFIERS

Northeast Electronics Corporation offers a line of precision transistorized measuring equipment and amplifiers designed primarily for the telephone industry to simplify transmission measurements and to reduce the testing and set up time. Rugged high quality construction and precision performance characterize this equipment which is currently used in quantities by the telephone industry.

MODEL TTS-4A
TRANSMISSION TEST SET

A portable transistorized battery operated general purpose transmission test set which is self-calibrating. It contains send, receive, and talk circuits which can be used simultaneously or independently. The TTS-4A is a basic unit with accessory covers available for extending its application. Model TTS-4XD is a dial adapter cover with dial, hookswitch, and space for a ringer. Models TTS-4XMF and TTS-4XMP each provide 27 step frequencies for testing FAA voice control frequencies and type A and FM program lines respectively.

MODEL TTS-5A
LEVEL AND VU METER

A portable transistorized test set with a 1 Milliwatt, 1,000 cps send provision, and a receive section for measuring VU and dbm levels down to —43 dbm on 0.2 db meter divisions; levels down to —60 dbm can be read on a lower portion of the meter scale. A 0 to 5 db continuously variable attenuator, 600/900 ohm DC blocked balanced transformers, hold coil, self-calibration circuits, and a high pass filter are also included. Model TTS-5B is functionally similar but lacks the balanced transformers, is a little smaller, and is less expensive.

MODEL TN-1 - IMPEDANCE
MATCHING NETWORK

The purpose of this network is to insure negligible terminal reflection effects due to mismatches between the 600 ohms test equipment and cable pair impedances at both ends of loaded exchange type cables. The unit provides means for switching in the required resistances, inductances and capacitances.

MODEL TA-1A
PROGRAM LINE AMPLIFIER

A transistorized program amplifier designed to operate from a 48 volt battery. The gain is 40 db and the total harmonic distortion at an output level of +18 dbm is 0.5% at 1,000 cps. Provided with balanced 600 ohms input and output transformers, and facilities for simplexing if desired. Available for rack or pole mounting.

MODEL 1060
ARTIFICIAL LINE

Simulates 6 different cable types; Model 1060A provides 6 sections of 3,000 feet each, and Model 1060B provides 2 sections of 500 feet each and 4 sections of 1,000 feet each. Suitable for simulating proposed transmission circuits, thus permitting immediate measurement of transmission for different conditions of loading, matching, amplification, etc.

MODEL 1096
RF POWER MONITOR

Designed for measuring "forward" and "reflected" RF power in fixed stations in the frequency range 40 MC to 1,000 MC. Available for several ranges of output power up to 500 watts. Equipped for mounting a coaxial attenuator for frequency and deviation measurements. Also available as Model 1096X, which includes a carrier operated relay for START DIAL or TRANSMITTER ON indication.

MODEL TTS-9
REFERENCE LEVEL GENERATOR

A rack mounted 1,000 cps tone generator providing a 1 milliwatt reference signal from a stable transistorized oscillator to two independent output circuits at 600 or 900 ohms output impedance. The Model TTS-7 is a battery operated portable version of the Model TTS-9 with a single output at 600 or 900 ohms.

MODEL TTS-9X
LOOP AROUND ADAPTER

This unit, together with the TTS-9 enables personnel at a control office to make transmission measurements on all CDO trunk circuits, including these equipped for one-way dialing from the CDO to the control office. The unit also provides a number of special line terminations. The input circuits to this unit are wired to subscriber number appearances in the connector multiple; connection to these special terminations is made by dialing the subscribers numbers assigned to them. This adapter permits remote selection of individual outgoing one-way dialing CDO trunks on a loop around basis; once the loop around circuit is established the one-way dial trunk can be switched to the reference level generator from the control office.

WRITE FOR SPECIFICATIONS

NORTHEAST ELECTRONICS CORPORATION

Box 425 : Concord, New Hampshire : CApitol 5-6641

"551" REPEATERS

Hybrid type

These repeaters for toll and inter-office trunks provide substantial gain beyond the capabilities of other repeaters. Initial cost is low; maintenance is centralized; flexibility is outstanding. Contact your Stromberg-Carlson representative.

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A DIVISION OF **GENERAL DYNAMICS CORPORATION**

ATLANTA: TRinity 5-7467 • **CHICAGO:** STate 2-4235 • **KANSAS CITY:** HArrison 1-6618 • **ROCHESTER:** HUbbard 2-2200 • **SAN FRANCISCO:** OXford 7-3630

50-combined-stock average showed an increase of 8 per cent over the 1958 year end. At the close Oct. 27, the comparable figure was 4 per cent, indicating a 3 per cent increase from the latter date. Compared with the close of business at the 1956 and 1957 year ends, the increases at Nov. 24 were 18 per cent and 38 per cent respectively.

Earnings of 795 corporations tabulated by the First National City Bank of New York were 36 per cent above 1958 for the first nine months of 1959, but the price-earnings ratios of most industrial equities still remain at spectacular heights in terms of financial history. It now seems apparent that 1959 is likely to be a year of digestion by the stock market of its too-rapid advance of the preceding year. Through the early part of 1958, earnings fell, but prices climbed, whereas in 1959, prices have risen only moderately on the average, despite substantial gains in income.

It's difficult to depart from the premise we have adhered to for some time past that utilities offer the best all-around market advantage, provided they are carefully selected and have reasonably attractive price-earnings ratios and dividend yields. Like many industrial stocks, equities of some "growth" utilities seem to have discounted progress far into the future, making continued climb in earnings at the phenomenal past rates compulsory, if present market prices are to be supported.

* * * *

ECONOMY HOLDS WELL DESPITE LABOR TROUBLES: The most pleasant surprise in recent months has been the strength indicated by the national economy in the face of the steel strike and consequent direct and indirect unemployment. Those indices which have shown declines during this period, have registered only modest ones, while many prime statistical items continued to record moderate gains.

Average earnings for 795 companies compiled by the First National City Bank showed practically no change in the third quarter from a year ago. This relatively poor showing was due to the impact of the steel strike on that and kindred industries. About 600 manufacturing companies included in the total showed a comparable increase of 5 per cent for the third quarter. Third quarter earnings of all the companies dropped 29 per cent below the favorable second quarter, but for the first nine months of 1959, their earnings remained 36 per cent ahead of 1958, as compared with an increase over that year of 56 per cent for the first half of 1959.

If a compromise of the steel controversy can be worked out before the 80-day "cooling off" period expires, improvement in business activity and earnings seems indicated for early 1960, but if such efforts fail and steel workers again leave employment, the economy will be faced with an increasingly serious problem. It seems likely the business boom will remain somewhat contained until the answer to this vital question is known.

While inflation has died down a bit as an acute problem, it still manifests itself in the vicious wage-price spiral. Examples of this are constantly cropping up. One was the recent wage rise in the milk industry in New York, promptly followed by an increase in retail price.

While this iniquitous wage-price spiral persists, all the budget balancing in the world won't prevent victimization of the large segment of the population consisting of fixed-income citizens, wholly or partly retired, who are forced to witness a constant rise in the price of their necessities.

* * * *

INCOME TAX OVERHAUL: This being a Presidential year, Congress (on the Democratic side at least) may strive for some tax reforms in 1960. There is great talk of loopholes when what is meant are provisions giving special advantages to particular classes of taxpayers--as, for example, the 27 per cent depletion allowance for oil and gas.

One of the items at which many "pot-shots" will be taken is the 4 per cent tax deduction allowed on dividends received. This was designed to stimulate stock investment and make slight recompense for the double taxation of corporations. However, opponents loudly claim it singles out this type of income for unwarranted preference. Another item which will probably receive serious consideration is withholding of interest and dividends similar to withholding of wages.

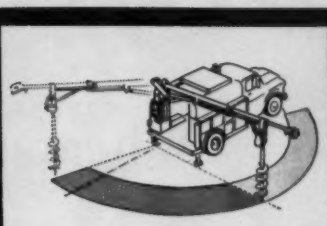
"CD" Radial Arm Hydraulic Derrick

swings to reach tight spots...
reaches out to dig a hole...
reaches up 28′ to set a pole...

The Tel-E-Lect CD Derrick mounts to the *left side* of the body to provide a wider range of operation with more stability . . . greater safety . . . better balance at work or in travel!

This derrick is designed to fit conventional utility bodies. It is furnished as a complete package with the entire hydraulic system factory assembled!

Safe load lifting capacity is 8000 lbs. at 80° . . . hydraulic stinger allows four-foot adjustment under loading conditions to meet critical job requirements. Maximum sheave height 28′.



FULL DERRICK RANGE . . . no need to position truck precisely for digging. Just pull up near pole location and let the Tel-E-Lect CD and digger reach out . . . in . . . or around to dig the hole exactly where you want it! Same feature makes pole setting . . . all derrick work easier!

LOADS INTO BODY . . . highly maneuverable CD Derrick lifts full capacity loads directly into truck body. Does it more safely, too, thanks to minute adjustments up, down or around now possible. Ideal for a combination yard and road truck.

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☐ Please send complete information
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ADDRESS _____

CITY _____ STATE _____

Wheatstone Bridge Measurements

By JOHN A. BRACKEN

Part 4

AFTER obtaining the distance in ohms from the testing point to the fault by completing the loop and Varley measurements, it is necessary to determine the actual distance in feet or miles. For example, suppose a telephone line 30 miles long is grounded, and by means of a Wheatstone Bridge in the central office, a loop resistance and Varley measurement of 342 and 185 ohms, respectively, is obtained.

The line is 104 (No. 12) gauge copper wire having a resistance of 10 ohms per loop mile. Part of the circuit consists of a cable pair having a loop resistance of 42 ohms to the cable point where the line is terminated. The distance to the fault is then calculated as follows:

The value of the loop resistance measurement minus the cable resistance, minus the Varley measurement divided by 2, and the result divided by one-half of the known resistance per loop mile of the line wire, or by formula: $D=\left(\frac{L-C-V}{2}\right)\div H$, where—

D = Distance in miles from the cable terminal pole to the fault.

L = Resistance in ohms measured to the loop placed at the distant end of the line.

C = Loop resistance of the cable pair from the central office to the cable terminal pole.

V = Varley measurement in ohms to the fault.

H = One-half of known resistance per loop mile of the line wire in trouble.

In this case the distance from the cable terminal pole to the fault is $D=\left(\frac{L-C-V}{2}\right)\div H$, or 342 — 42 — 185 = 115 ÷ 2 = 57.5 ÷ 5 = 11.5 miles. The distance from the fault back to the end of the line where the line wires are looped together may be determined by the formula: D B = V ÷ L M, where—

D B = Distance from the fault back to the end of the line.

V = Varley measurement.

L M = Resistance per loop mile of the line wire.

In the above case, the distance back will be, D B = V ÷ L M, or 185 ÷ 10 = 18.5 miles. Adding the distance to the fault and distance back together equals the total length of the line wire, or 11.5 + 18.5 = 30 miles.

If the lead is numbered from the cable terminal pole, the fault should be in the neighborhood of a certain pole number determined by the formula: P N = D × P P M, where—

P N = Pole number.

D = Distance to the fault.

P P M = Number of poles per mile in the lead.

Assuming that the lead has 40 poles to the mile, the fault is in the vicinity of pole number P N = D × P P M, or 11.5 × 40 = 460, and may be checked as follows:

(1) The lead is 30 miles long.

(2) The loop resistance of the line from the cable terminal pole to the distant end is 300 ohms.

(3) The number of pole sections equals 30 × 40 = 1,200.

(4) The loop resistance of the line per pole section equals 300 ÷ 1,200 = 0.25 ohms.

(5) Since the loop resistance per pole section equals 0.25 ohms, the number of poles from the cable terminal pole to the fault equals 115 ÷ 0.25 = 460 as before. The factor 115 is obtained as the result of subtracting the 185 ohms Varley measurement from the line wire 300 ohms loop resistance.

In cases where the loop resistance per mile of a particular line circuit is unknown, the distance to the fault may be closely approximated by means of the formula: $D=\left(\frac{L-V}{L}\right)T$, where—

D = Distance in miles.
L = Loop resistance measurement.
V = Varley measurement.
T = Total length of circuit in miles.

For example, in the preceding case, $D=\left(\frac{L-V}{L}\right)T$, or 300 — 185 = 115 ÷ 300 = 0.383 × 30 = 11.49 miles to the fault.

Again, when it is desired to locate a ground on a line and its loop resistance per mile is unknown, the Murray loop test may be used in determining the distance to the fault in such a way that the result is independent of the resistance of the fault itself. However, as in the Varley test it is important

(Continued on page 52)

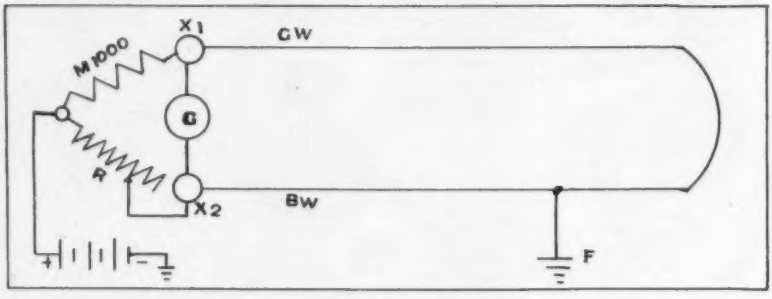
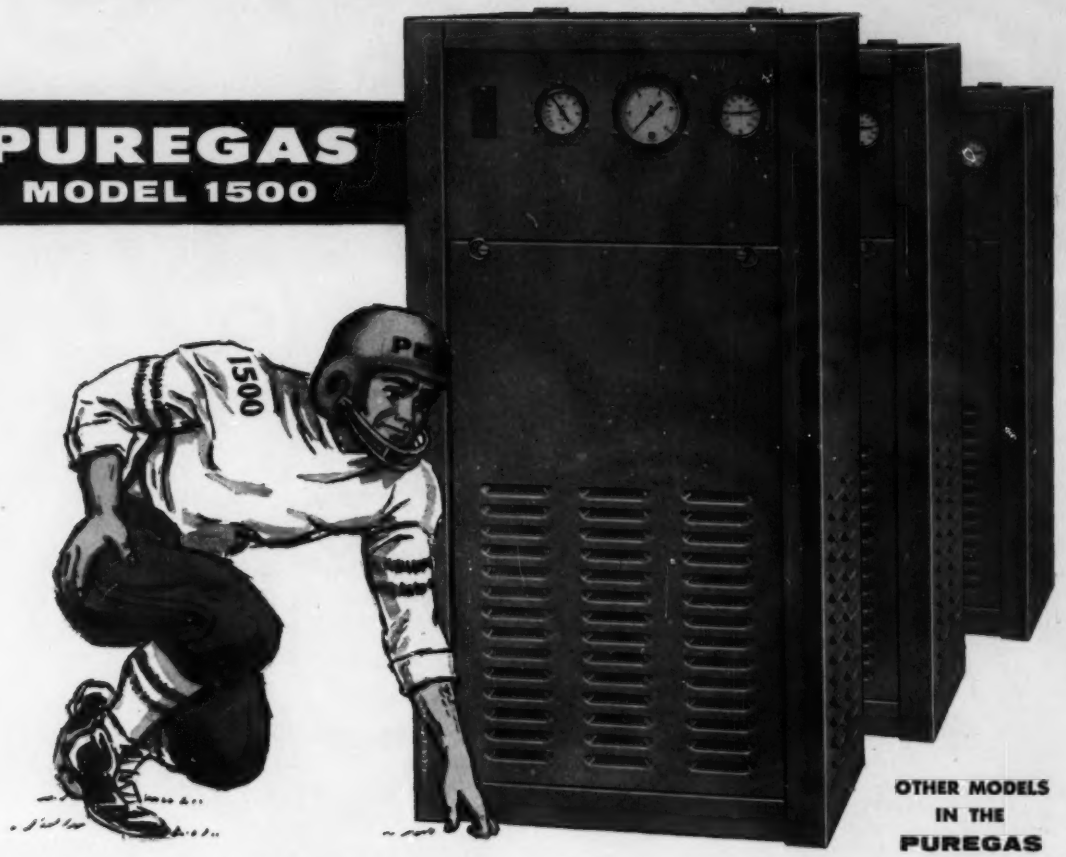


Fig. 1

an addition to our line
. . . the RIGHT GUARD for your line!

PUREGAS
MODEL 1500



BLOCK MOISTURE INTERFERENCE

The new PUREGAS 'forward' look includes three new models designed to service all operations from the smallest installation to the very largest system.

With the new No. 750 - 1500 and 5000 models, PUREGAS equipment can now be progressively planned into any size improvement budget. Naturally, wherever PUREGAS goes to work guarding and protecting cables from moisture; service improves, maintenance costs decline and greater profits are reflected.

PUREGAS equipment is self liquidating since it pays for itself in labor savings, reduced cable replacement and greater overall operational efficiency.

If your goal is better service with reduced maintenance costs you should start your planned PUREGAS pressurizing program now.

OTHER MODELS IN THE PUREGAS LINE

MODEL 5000

MODEL 750

Send for Bulletin 110 on gas pressurizing and specification sheets on the above units.

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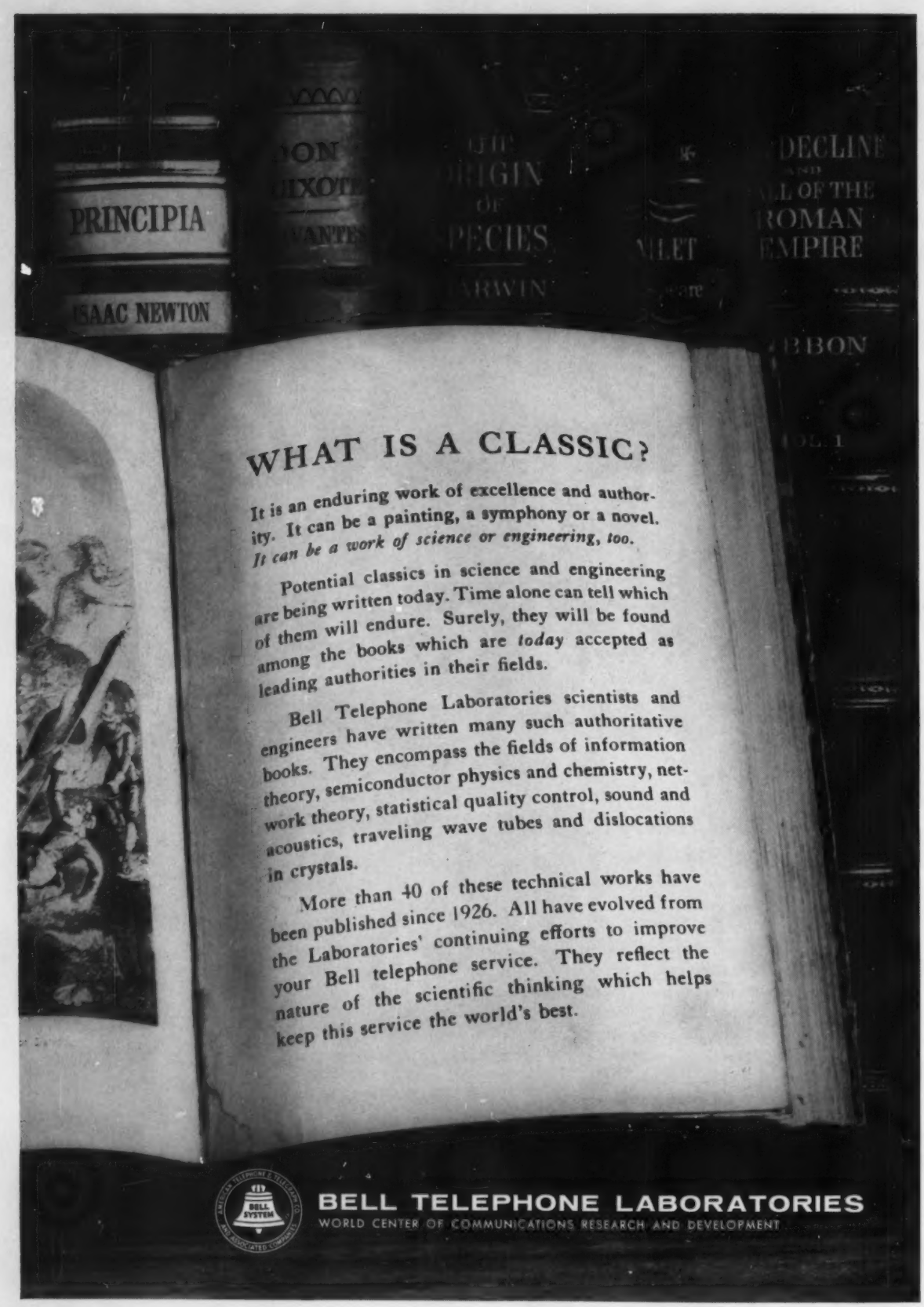

WHAT IS A CLASSIC?

It is an enduring work of excellence and authority. It can be a painting, a symphony or a novel. *It can be a work of science or engineering, too.*

Potential classics in science and engineering are being written today. Time alone can tell which of them will endure. Surely, they will be found among the books which are *today* accepted as leading authorities in their fields.

Bell Telephone Laboratories scientists and engineers have written many such authoritative books. They encompass the fields of information theory, semiconductor physics and chemistry, network theory, statistical quality control, sound and acoustics, traveling wave tubes and dislocations in crystals.

More than 40 of these technical works have been published since 1926. All have evolved from the Laboratories' continuing efforts to improve your Bell telephone service. They reflect the nature of the scientific thinking which helps keep this service the world's best.

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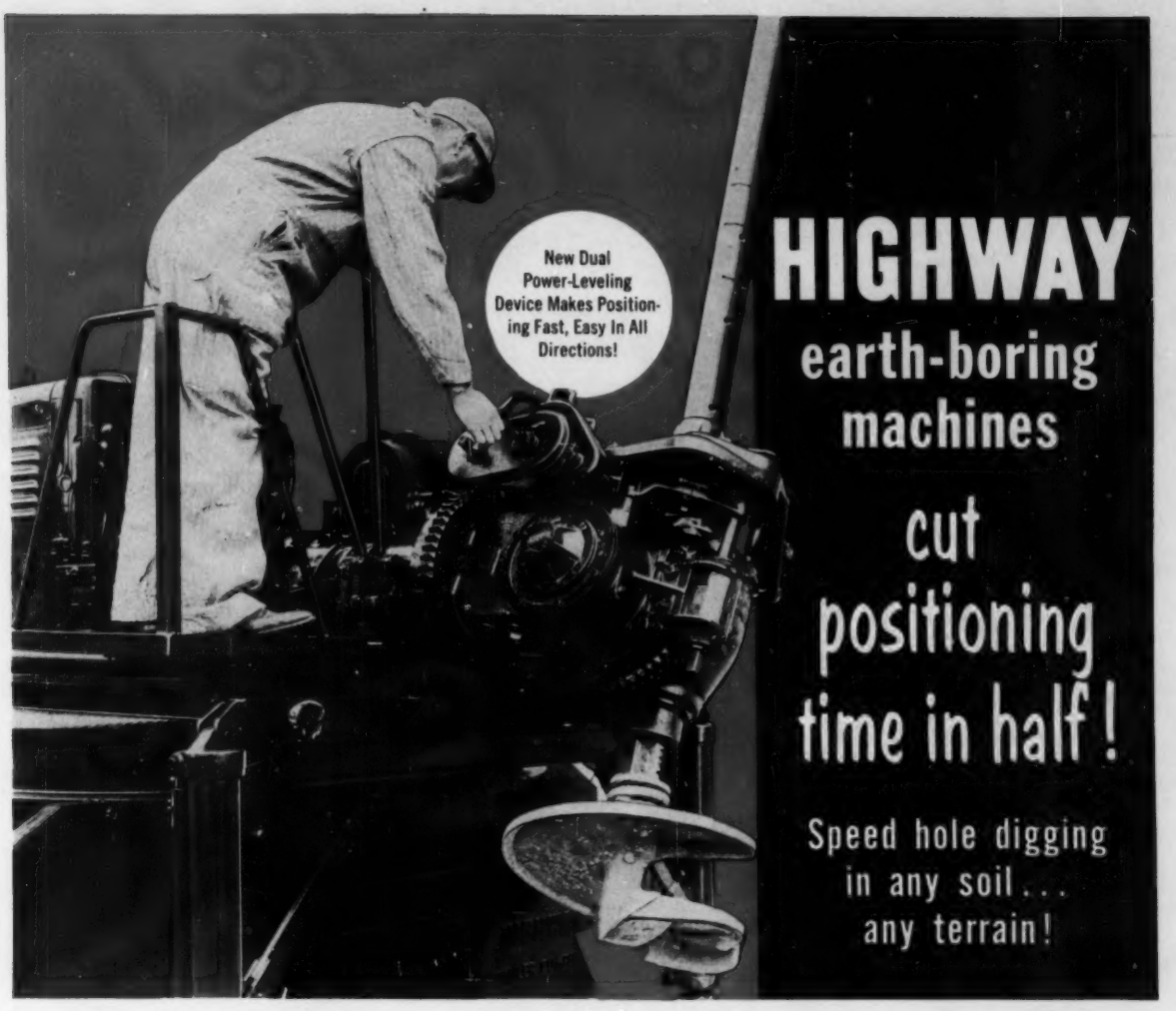
WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT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Speed hole digging in any soil... any terrain!

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to have the "good wire" of the same gauge, length and conductivity as the "bad wire."

The Wheatstone Bridge circuit arrangement for the Murray test is illustrated in the schematic diagram shown in *Fig. 1.* For example, a line 20 miles long is grounded. What is the distance to the fault "F"?

(1) The "good wire" (GW) and the "bad wire" (BW) are looped together at their distant end.

(2) A local ground is connected to the bridge "GR" binding post, for the purpose of connecting the bridge battery to ground when the cam lever switch is operated to the "MUR," also "VAR" position.

(3) The bridge cam lever switch is operated to the "MUR" position (see *Fig. 1* and Chart 1 in Part 2 (TELEPHONY, Nov. 21.)

(4) The ratio dial is set at M 1000, the rheostat "R" dials rotated, and the galvanometer shunt keys manipulated until the bridge is balanced, that is, the galvanometer needle rests at zero. If not, it may be necessary to rotate the ratio dial to M 100 or M 10 to obtain a balance.

(5) The distance to the fault is calculated by means of the Murray loop formula: D = L2R ÷ (M + R), where—

D = Distance to the fault.
L2 = Twice the length of the "bad wire."
M = Bridge ratio dial setting, M1000, M100, or M10 as required.
R = Rheostat reading (Murray measurement).

Suppose, in this case, the rheostat reading is 600 ohms, then D = L2R ÷ (M + R), or 20 × 2 × 600 ÷ (1000 + 600) = 15 miles to the fault. This result may be verified by transposing the line wires at the bridge "X1" and "X2" binding posts, and again balance the bridge.

Suppose the second measurement is 1,666 ohms. Then, by the formula: D = L2R ÷ (M + R), or 20 × 2 × 1666 ÷ (1000 + 1666) = 25 miles. Adding together the two values and dividing by 2, should equal the distance between the testing point and the distant end of the circuit, where the line wires are looped together, or 15 + 25 = 40 ÷ 2 = 20 miles, actual length.

An ideal condition for testing a grounded line conductor is for the insulation resistance of the selected "good wire" forming the loop to be high, at least one megohm (1,000,000 ohms) is considered best.

The insulation resistance of a telephone line circuit is the joint resistance of all the paths along the entire line from which a current can escape or leak to the earth. The insulation resistance varies immensely and the longer the line, the lower the insulation. The term "leak" is used to express current loss through imperfect insulation.

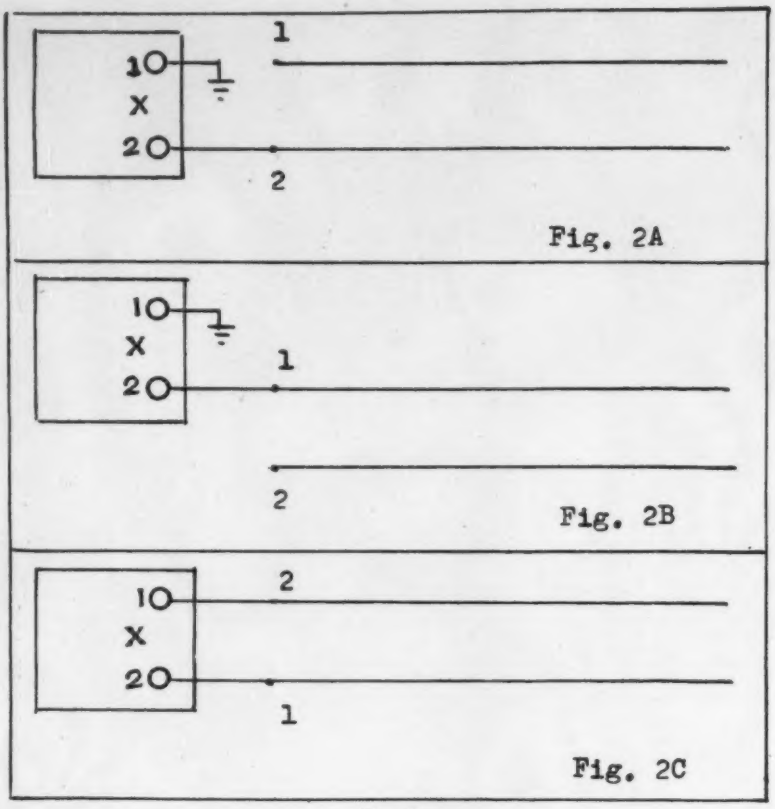


Fig. 2

In determining the value of the insulation resistance, it is usually expressed as the average resistance in megohms per mile, rather than a value in ohms for the entire circuit. The insulation resistance of a line is determined in two ways, first the resistance of each conductor to ground, and second, between the conductors.

Insulation resistance may be measused by a Wheatstone Bridge equipped with an operating battery of 100 volts or more for best results. These measurements should preferably be made on a clear dry day.

Method of performing insulation tests:

(1) Have the distant end of both line wires under test, open and clear.

(2) Test to ground: Connect a local ground to the bridge "X1" binding post.

(3) Connect line wire "2" to the bridge "X2" binding post. (See *Fig. 2A.*)

(4) Set bridge ratio dial at $\frac{1000}{1}$

(5) Operate the cam lever switch to the "RES" position.

(6) Rotate the bridge rheostat dials in conjunction with manipulating the galvanometer shunt keys until the galvanometer needles rest at zero. Note the rheostat reading.

(7) Remove line wire "2" from the bridge "X2" binding post, and connect line wire "1" in its place. (See *Fig. 2B.*)

(8) Repeat the operation of Item 5, above.

(9) Test between the two line wires: Disconnect the local ground from the "X1" binding post.

(10) Leave line wire "1" connected to the "X2" in place.

(11) Connect line wire "2," previously tested, to the "X1" binding post. See *Fig. 2C.*

(12) Repeat the operation of Item 5.

Suppose the rheostat reading in all three measurements to be 1,000. Then the insulation resistance in each case is equal to $\frac{1000}{1}$, or 1,000 × 1,000 = 1,000,000 ohms, or 1 megohm.

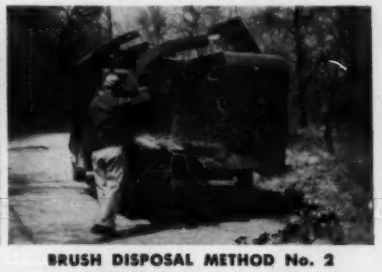
Suppose the line is 10 miles long, then the insulation resistance per mile to ground and between the pair is equal to TL × IR, where—

(Continued on page 90)

Telephone and Power Companies CUT BRUSH DISPOSAL COSTS 25 TO 50% with FITCHBURG CHIPPERS

Crewmen from Rockland Light and Power Company, now Orange & Rockland Utilities, Nyack, N. Y. use special aerial ladders for pruning topmost branches.

BRUSH DISPOSAL METHOD No. 1
Rockland Light and Power Company crewman blows chips from FITCHBURG CHIPPER along roadway.



BRUSH DISPOSAL METHOD No. 2
Rockland Light and Power Company crewman blows chips from FITCHBURG CHIPPER into truck bin.

Some of the many Telephone and Power Companies using Fitchburg Chippers

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Atlantic City Electric Company
Atlantic City, New Jersey
Central Hudson Gas and Electric Co.
Newburgh, New York
Consumers Power Co.
Jackson, Michigan
McDaniel Telephone Company
Salkum, Washington
Millington Telephone Co.
Millington, Tennessee
Mt. Vernon Telephone Corp.
Mt. Vernon, Ohio
Missouri Power & Light Co.
Hermann, Missouri
New Jersey Bell Telephone Co.
Vineland, New Jersey
Ohio Central Telephone Corp.
Patuskala, Ohio
Pacific Telephone and Telegraph
Northwest Area
Portland General Electric
Portland, Oregon
Public Service Co. of Oklahoma
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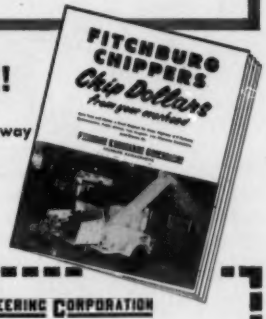
NEW! FREE!

Mail Coupon for Brochure. Shows cut-away drawings of Fitchburg Chippers in action, specifications, photographs.



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Future of Rate Structures Studied at Virginia Convention

By Dan S. Fargo

SPEAKING to the silver anniversary convention (Oct. 29-80) of the Virginia Independent Telephone Association in Roanoke, Frank S. Givens Jr., state corporation commission engineer, declared: "I agree with statements by authorities that there have been more changes and improvements in telephone service in the years since World War II than in all the previous history of telephony, and it is predicted that the next 15 years will show as great a change as the last 15.

"One of the great changes may be in the rate structure, and (the following) thoughts as to the possible direction of change are offered for your consideration."

Mr. Givens mentioned having heard of a trial being made by a Wisconsin company in which four-party service is being offered throughout their rural territory at a flat rate of $1.00 a month higher than the previous multiparty rate. The acceptance has been good, he said, and there has been an improvement in service.

Speculating on what a good rate structure might be like, Mr. Givens said the measurable components are a message or circuit over distance for a period of time. To give it a name, he said, call it "message-minute-mile," or the abbreviation "MMM." He further explained:

"The subscriber could be assigned an arbitrary mileage based on average distances from central office in zones for his local calls. On calls between central offices, the airline distance could be used. On each call the mileage and minutes would be integrated and posted to the total MMM, regardless of the distance or length of call.

"The subscriber would have a minimum allowing a certain number of MMM, or would have a small readiness-to-serve charge in addition to the usage charge. Such features as discounts for off-peak service or promotional rates for high usage subscribers could be used. Grade of service or number of circuits could be supplied by the company on the basis of the MMM over a test period.

"What would be the advantages of such a system?

"(1) A measurable service with charges based on the subscribers' actual usage of the company's facilities.

"(2) An increase in revenue when there was higher usage of plant without a rate case.

"(3) A smaller problem of exchange boundaries and EAS demands.

"(4) Better subscribers' acceptance of telephone charges.

"(5) A better basis for toll settlement with MMM's purchased in bulk.

"As to disadvantages, I will let you speculate on those for several years ahead."

Mr. Givens also told of recent conferences between the commission, its engineering division and the Chesapeake & Potomac Telephone Co. (Bell System) to discuss the company's plan to eliminate, gradually, four-party residence service in the base rate area, two-party business service, and eight-party rural service.

"The reason for the changes," he said, "is that old American spur to our business world that the customer doesn't like the service and it's too expensive to serve, with the ever-chang-

(Continued on page 60)

Speakers at the morning session of the Departmental conference at the Virginia convention. Left to right: L. E. Beydler Jr. of Harrisonburg, Va., departmental conference chairman; Arnold Swallows of Durham, N. C.; Frank S. Givens Jr. of Richmond, Va.; and H. D. Long of Richmond, Va.

ESCO RINGING EQUIPMENT

MEMBER

ADDITIONAL ESCO FEATURES (details in future ads pictured on the dial) — further explain why Esco components are included in installations of prominent suppliers like Automatic Electric Co., Federal Telephone and Radio Corp., Kellogg Switchboard and Supply Co., Leich Sales Corp., and Stromberg-Carlson Co.

motor-driven tone alternators for tones matching Bell System

Esco tone alternators combine a drive motor and up to three permanent-magnet tone generators in a single frame. The alternators develop standard Bell System 500 and 600 modulated 120 cycle tones. An optional third circuit supplies a 420 modulated 40 cycle tone for ring back. What's more, with Esco motor-driven tone alternators, the same drive motor supplies driving power for the interrupters as well. This integrated design saves space and equipment and it means better balance and alignment, too.

As you would expect, Esco alternators feature permanently-sealed, precision ball bearings, protected construction, finest materials and workmanship, plus rigid tests and inspection throughout manufacture — they're made by specialists in rotary electrical equipment.

These are some of the reasons why Esco alternators give smoother, quieter operation and longer life — some of the reasons why so many equipment engineers and suppliers choose Esco. But get the full facts for yourself. Send for our free booklet on ESCO RINGING EQUIPMENT today.

Write today for full information

ELECTRIC SPECIALTY CO.
176 South Street, Stamford, Connecticut

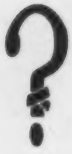
See how Leich's Cuts Outside Plant

In growing areas, the cost of providing telephone service is becoming more and more expensive. Leich's Line Concentrator provides many ways to economically solve this problem. It lets you add telephones in an area without installing additional outside plant.

By distributing a number of subscriber lines over a few trunks to the central office, it greatly reduces outside plant costs. It uses the same principle that is the basis of all central office layout; among a large group of subscribers, only a few will require telephone service at the same time.

A concentrator installation consists of two units—an exchange unit and a remote subscriber unit. No power is required at the remote distribution point. No modifications are necessary in the central office switching equipment, which can be either manual or dial.

Here's a Typical Problem



Seventy stations are served by a 25 pair cable into an area, and no spare facilities are available. You are faced with a demand for upgraded service by most of the seventy subscribers. What's more, a new housing development will soon require an additional 12 lines.

To furnish the desired service, you would normally add 25 cable pairs. In this case, it would mean replacing 3200 feet of 26 pair cable with 51 pair at a cost of $2,200. An additional $6,800 would have to be spent on feeder cables. Your total costs would be approximately $9,000.

LEICH GENERAL SYSTEM

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

Line Concentrator Costs in Growing Areas

Leich's Line Concentrator Cuts Costs 50%

Since Leich's Line Concentrator lets you "concentrate" the calling load of a large group of lines onto a few cable pairs, it would *not* be necessary to add the new and larger cable facilities. For example, Leich's 49-9-2AZ Concentrator uses only eleven cable pairs for 9 traffic trunks (with 2 pairs for control purposes) to serve 49 subscriber lines. Any 11 of the cable pairs may be used for the concentrator trunks and control leads, and the subscriber lines formerly served thereon shifted to concentrator lines. For maximum effectiveness, lines on which the traffic is light are best suited for concentrator assignments. You would then be able to upgrade existing service, furnish the 12 lines to the new housing development, and be able to absorb some future growth without addition of cable.

The 49-9-2AZ Line Concentrator, including the All Trunks Busy option and weather-proof cabinet for mounting the subscriber end unit costs you only $4,205 plus your installation costs. Since the conventional cable relief job would cost $9,000, your expense is halved.

Prompt Delivery From Stock on Two Models

Two basic sizes of the Leich Line Concentrator are available from stock. They can be shipped within 30 days from receipt of order.

The 49-9-2AZ, is equipped with 49 lines and 9 traffic trunks and 2 control trunks. The 49-18-3AZ is equipped with 49 lines, 18 traffic trunks, and needs three pairs for control purposes. The latter unit will accommodate a higher calling rate.

There are so many different ways you can use the Line Concentrator to save on plant costs, to upgrade service or to add customers. A Leich sales engineer is available—no obligation—to tell you the whole story. Write today.

LEICH SALES CORPORATION • 427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS
PACIFIC COAST: 11401 W. PICO BLVD., LOS ANGELES 64, CAL.
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SOUTHWEST: 1227 SLOCUM STREET, DALLAS 7, TEXAS
SOUTHEAST: 5126 SOUTH LOIS ST., TAMPA 11, FLORIDA
manufacturers of telephones, switchboards and related apparatus since 1907

New ORANGEBURG® CA* CONDUIT *with Flush Coupling Attached!*

With no separate couplings to handle or attach on the job, Orangeburg CA lays faster, costs less to install. Each long, light length has a *flush* coupling attached at one end and a standard 2° male taper at the other end, making installation a simple, one-step operation. And, since the coupling *is* attached, there are no coupling cartons to warehouse or carry to the job.

What's more, with the coupling *flush* to the conduit's outside wall, new CA is easy to stack, store and handle. The flush coupling also eliminates "staggered" joints in the trench. And that means real savings in cutting and tooling time.

Like the hundreds of millions of feet of Orangeburg fibre conduit in use since 1893, new CA has self-sealing joints and impermeable walls. Its smooth, 100% fibre raceway adds years to cable life.

New Orangeburg CA is available in 2", 3", 4", 4½" and 5" sizes. Orangeburg Standard and Nocrete Conduit, with separate sleeve couplings, are available as always. Write Dept. T-129 for Catalog 52.

ORANGEBURG MANUFACTURING CO.
Orangeburg, New York • Newark, California
A Division of The Flintkote Company, Manufacturers of America's Broadest Line of Building Products

Orangeburg Fibre Conduit is distributed by Graybar Electric Co. and General Electric Supply Co. with branches and stocks in principal cities.

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YORK-HOOVER "Bobcat"

LINE CONSTRUCTION BODY

featuring MORE STABILITY
where HEAVY LOADS are handled by THE DERRICK

6 COST-SAVING FEATURES

GALVANNEAL STEEL CONSTRUCTION
superior corrosion resistance

HEAVY DUTY BASE
provides maximum strength and rigidity

SIDE BOXES
arranged for quick access to tools and materials

DOORS
rigid, sag-free, low maintenance

SUPERSTRUCTURE ASSEMBLY
low, compact, easy loading

DERRICK AND DIGGER EQUIPMENT
wide variety, tailored to your needs

GET ALL THE FACTS ABOUT THE "BOBCAT"

CLIP AND MAIL TODAY!

Dept. T, York-Hoover Corporation
York, Pa.

Gentlemen,

Please send us a copy of Bulletin No. 947 covering your new "Bobcat" Line Construction Body.

Name_____

Company_____

Address_____

City and State_____

Creative Engineering for the Public Utility Industry Since 1892

YORK-HOOVER CORPORATION, YORK, PA.

ing equipment, the few who wish to retain an outmoded service." In regard to possible withdrawal of four-party residence service, Mr. Givens said:

"The four-party residence service in base rate areas has decreased in popularity where it is offered. Only about 5 per cent of new connections are for four-party service. The percentage of four-party residence service has decreased steadily from 11.9 per cent in 1950 to 6.5 per cent as of Aug. 1, 1959.

"Of the number now served, it is estimated that there are several thousand who have requested higher grade service, which will be furnished in the near future.

"Four-party service has the disadvantage of less privacy, less availability, more delays, customer complaints and interference. In certain instances, direct dialing of toll calls will not be available to four-party subscribers.

"It is proposed to withdraw the four-party offering, exchange by exchange, when regrade orders have been reduced to an insignificant number and four-party residence service is less than 10 per cent of all residence main services in the rate area, or less than 25 in number.

"A date in the future will be set for withdrawal of the service to any remaining subscribers. The average increase for regrade to two-party service is 83 cents per month."

Mr. Givens presented additional statistics and findings lending encouragement to the withdrawal of two-party business service and eight-party rural service.

Conrad J. Logan of Tarboro, N. C., association president, presided at the first day's sessions, L. E. Beydler Jr. of Harrisonburg, at the second. Convention registration totaled 346.

The Virginia association's senior living past president, F. T. Prufer, reviewed "25 Years of Progress." He noted among the advances made by the state corporation commission, that of continuous investigation, which, he said, has helped minimize regulatory lag. Mr. Prufer listed improvements in the telephone art in the past quarter-century, including Direct Distance Dialing (DDD) and concerted selling of telephone service.

New officers elected by the Virginia Independent Telephone Association are: Virl L. Choate of Martinsville, first vice president; Charles P. Lamm of Charlottesville, secretary-treasurer; C. Lacey Compton of Manassas, president, and A. G. Stogdale of Staunton, second vice president.

Approximately 100 attended the ladies' luncheon at the recent Virginia convention. Pictured above at the speakers' table are: Mrs. Mildred C. Eddins of Harrisonburg, Va.; Mrs. O. O. Utt of Lynchburg, Va.; Miss Mary Lee Draper of Staunton, Va., (ladies' luncheon committee chairman); Mrs. Conrad J. Logan of Tarboro, N. C.; Mrs. C. Lacey Compton of Manassas, Va.; and Miss Evelyn Davis of Martinsville, Va.

Conrad J. Logan, president of the Virginia association, discusses convention plans with R. S. Yeago Jr. (left), convention chairman, and Paul E. Warren Jr. (center), registration chairman.

Looking ahead, he cited predictions of a United States population rise from the present 175 million to 250 million in less than 25 years. Also, Mr. Prufer forecast that all Virginia subscribers will some day be on a subscriber toll dialing basis, and that larger and larger calling areas will come into being.

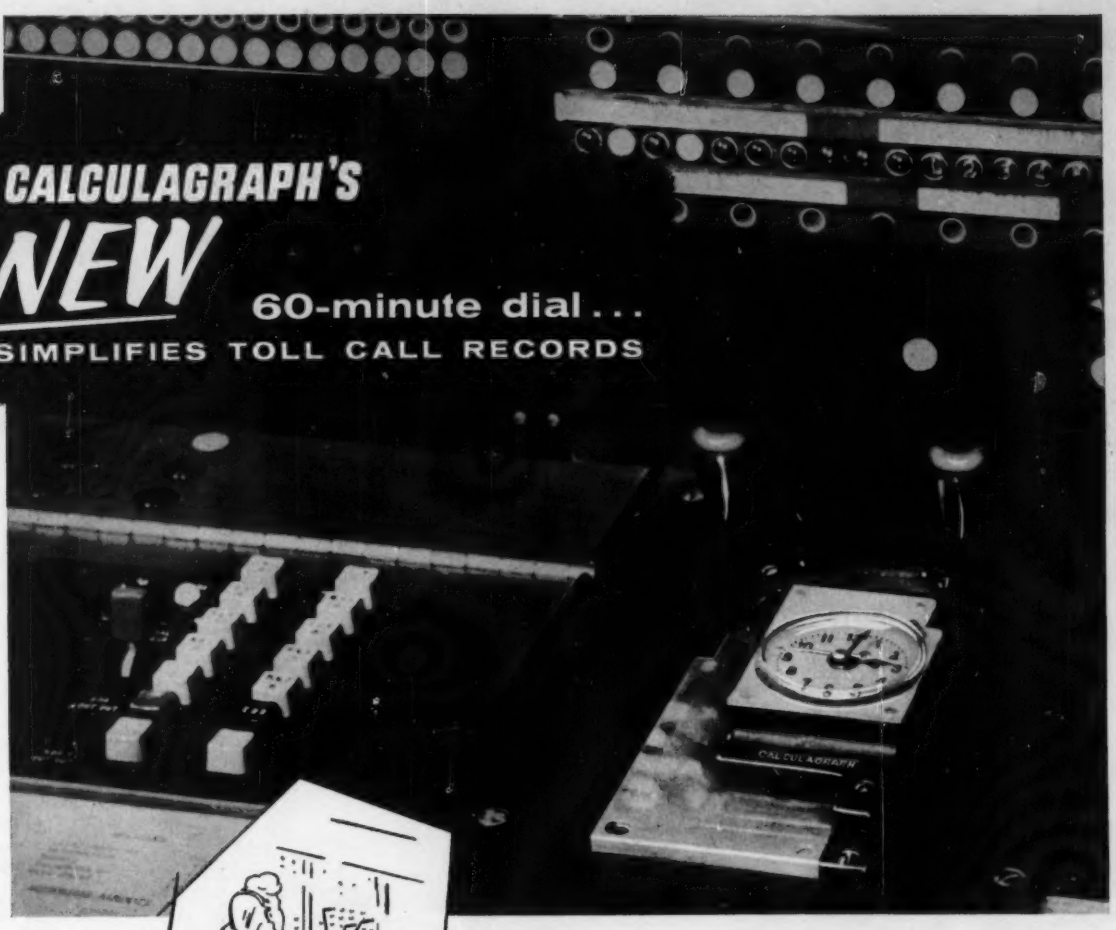
Erwin H. Will, vice chairman of the board of Virginia Electric & Power Co., speaking on "Some Utility Problems—Past, Present and Future," reviewed the postwar problems of customer demand outrunning available service facilities; the gap in the flow of trained personnel; financing expansion, and public relations difficulties due to shortages.

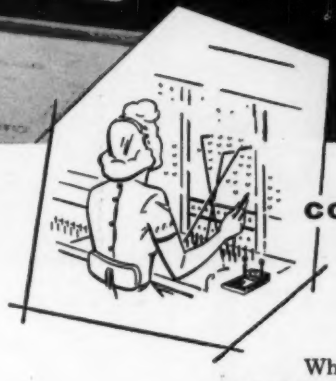
Mr. Will observed that the future of some Independents "might be wrapped up in the popular present-day merger approach;" and that mergers would

(Continued on page 90)

CALCULAGRAPH'S NEW 60-minute dial . . .

SIMPLIFIES TOLL CALL RECORDS





CONVERT YOUR SWITCHBOARD NOW!

Busy telephone operators are finding the new Calculagraph 60-minute dial *easier to use* and they can now handle more calls more efficiently.

Why? Because they don't have to remember to stop and add 30-minutes to long conversations. This new 60-minute Calculagraph dial does it for them.

This new Calculagraph 60-minute dial assures you, too, of *all charges* due on every call. If you now have 30-minute dials, you can convert your Calculagraphs to the 60-minute dial.

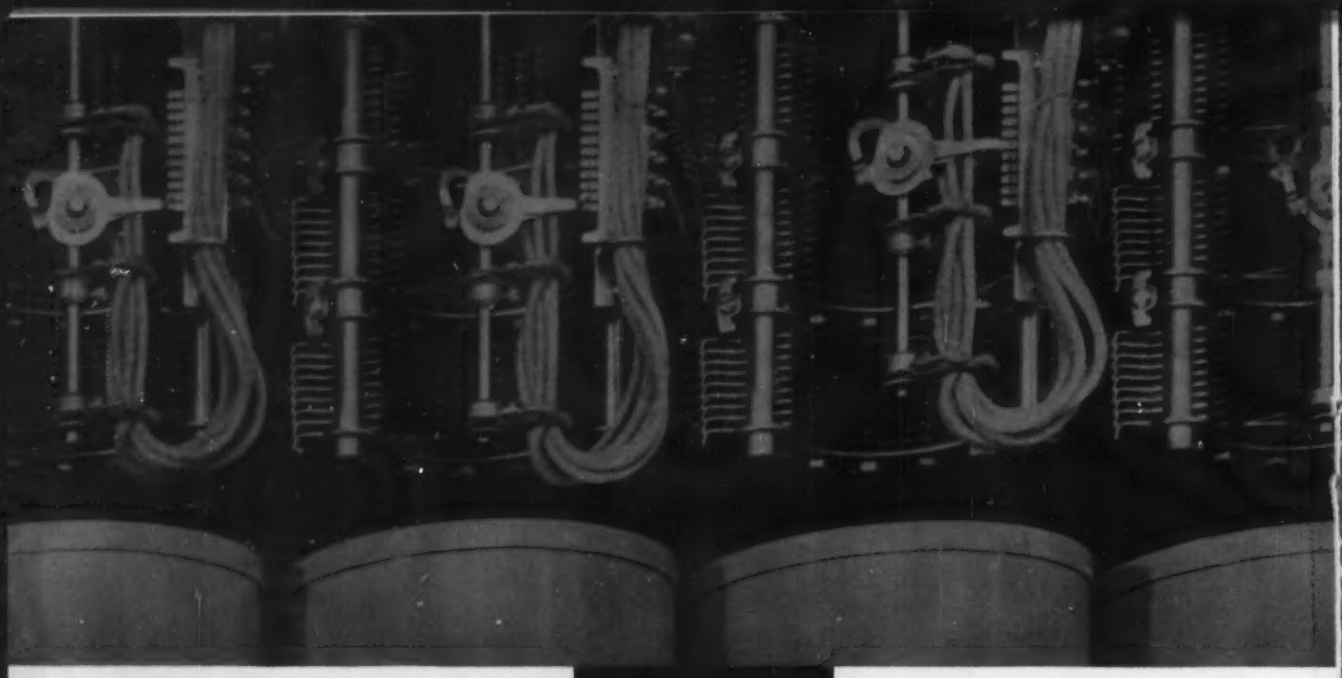
Whether your needs can be met with either the 30-minute or 60-minute dial you can be assured of *100% accuracy* on *all toll calls* with Calculagraphs on *your* switchboard.

Write today for complete information.

CALCULAGRAPH Company

312 Sussex Street • Harrison, New Jersey

MANUFACTURERS OF ELAPSED TIME RECORDERS FOR OVER 65 YEARS



Quality construction is an important factor to the man who selects dial switching equipment. That's why so many telephone men have toured our factory at Northlake, Illinois, to see the entire manufacturing process of Strowger equipment. They've seen how raw materials are carefully inspected for quality. They've observed the close tolerances to which each Strowger part is manufactured to insure ease of adjustment. They've watched the accurate control that is applied in the finishing of Strowger parts to provide good fit and lifetime protection. And, they've noted the constant inspection of these parts during every stage of production. No wonder so many telephone men choose Strowger!

QUALITY CONSTRUCTION...

another reason why telephone men choose Strowger!

FIND OUT FOR YOURSELF! The next time you're in the Chicago area, come and visit us. We'll be glad to show you through our entire Northlake plant. You'll see the unsurpassed quality and craftsmanship in the construction of Strowger. To make arrangements for your tour, write Automatic Electric Sales Corporation, Northlake, Illinois.

AUTOMATIC ELECTRIC GENERAL SYSTEM

Subsidiary of

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THE Operator's Corner

By MAYME WORKMAN — TRAFFIC EDITOR

CAN YOU speak before a group, when called upon, without fear and trembling? If not, why not do something about it?

In this day and age, we are likely to be called upon "for a few remarks" almost any time, or on any occasion, and it's best to be prepared to stand up and make those few remarks with ease.

A number of years ago, the writer conducted a three-day chief operator's school. A part of the program consisted of instruction in public speaking. The reason for stressing this was the fact that chief operators should be able to speak effectively to their fellow workers and be able to make a talk before a civic group if invited to do so by their managers.

During the course, each of the 55 chief operators attending the school, was assigned a topic and was asked to prepare a one-to-five minute talk on the subject assigned to her.

The following day, the names of the chief operators and their subjects were entered on slips of paper. As each girl's name was drawn, she came forward and made her talk. The results were surprising.

Some presented their topic in verse, some were at ease, others were timid, but at the conclusion of the conference, all agreed they had profited by the experience. Some of these chief operators had never faced an audience before and they were ill at ease in doing so, to say the least.

This was true of "Betty." She was very timid. Later she informed the writer, "It was the hardest thing I ever did in my life, but I am glad you made me do it. I know I shall never be that afraid again if anyone calls on me to speak."

Telephone operators and chief operators have one public speaking advantage in that they have been trained in the proper use of their organs of speech. Therefore, they are able to enunciate clearly and distinctly. This is certainly an important feature of public speaking for, if the speaker cannot be heard nor understood, all of his statements are a total loss.

Some telephone company employes have public speaking clubs. One such club has been organized by employes of the General Telephone Co. of Florida.

Their club, "Generally Speaking," holds regular weekly meetings.

According to Dick Buckingham, of the company's public relations department, "Since the inception of our first public speaking club, here in Tampa, we have all noticed definite improvement in the speaking ability of the 14 men who meet each week. All of the members are aware that the ability to communicate ideas to others is highly important to each employe's potential for advancement within the company.

"Offhand, I wonder how many other groups meet as we do during our lunch hour. More than half of our members were in the habit of bringing their lunch with them each day. The others liked the idea and joined the 'bucket brigade.' We all feel that our meetings are rewarding to each of us in self-improvement, enlightenment and entertainment."

Remember the song, "What *You* Can Do, *I* Can Do Better?" Well, we do not wish to outshine the men in the industry, but we should at least try to keep up with them, when it comes to self-improvement, enlightenment and entertainment.

While there are many courses in public speaking available today, it is always more fun to work together with people we know and who are employed in the same industry, having the same interests and objectives.

There is a long winter ahead of us for planning, so why not include a public speaking club? If you do, and you enter into the project whole-heartedly, by spring you will be rewarded by having acquired poise, self-assurance and knowledge that will be helpful to you. This will help you not only on the job, but in your personal life as well.

Don't just admire or marvel at the person who is able to speak effectively and with ease when called upon to do so. Take the time and make the effort to place yourself in the same category and you will have the satisfaction of having others say of you, "How I wish I could speak as easily as she does!"

Self-improvement is not just for the young. It is for everyone. We never grow too old to learn, and learning new things adds a great deal to the zest of living. Don't *think* yourself into old age by coming to the conclusion, "I'm too old to do this or to participate in that!" The older person, who keeps abreast of the times, who maintains a sense of humor, and who remains young in spirit, is always welcome in any group.

The human mind ages very slowly and, since mind has considerable control over matter, we can retain a youthful mental attitude indefinitely. The years may be piling up and the body may slow up a little, too, but it will slow up much more slowly if we maintain a bright outlook on life.

Regardless of your age, if you awaken in the morning with a feeling, "I'm sure this will be a wonderful day," most likely, it will be. So—"Keep young and keep happy."

Traffic Questions

(1) In recording a call, if the calling party gives a number which differs from that obtained from any other source, should the operator refer the call to her supervisor or proceed with the call herself?

(2) On a long distance call, if a request not to be called until ready is received, and the call is to be worked on at once, should the operator ask the calling party to hold the line?

(3) In reaching a called party, if the

(Continued on page 96)

You're miles (and dollars) ahead with CABLEGARD™*

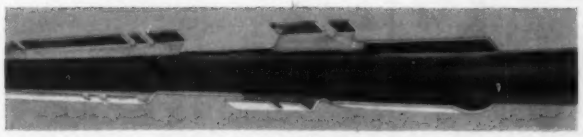
New Butler Cablegard™ is a split-pipe sheath for cable . . . gives the protection of solid-wall pipe or conduit, yet installs in minutes—with no special skills needed! It's flanged to *clamp around cable*, avoids the cost of time-consuming cutting and splicing.

Cablegard is the fastest, lowest-cost way to take cable under stream beds, over culverts, across rock ledges—anywhere, above or underground. Works fine below sidewalks or as terminal shielding . . . use it wherever steel protection is needed.

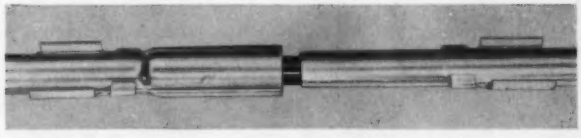
Approved by R.E.A. (see REA Bulletin 344-2) . . . hailed by cost-conscious companies, Cablegard is a tested, *proven* product. It will, literally, put your plant construction program miles and dollars ahead! Contact your telephone equipment supply house, or write to us for full details.

*PAT. PENDING

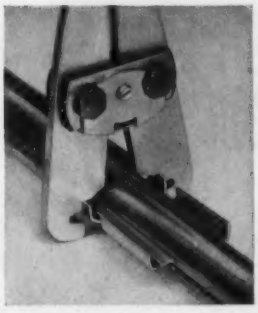
the protection of solid-wall pipe . . . above or underground



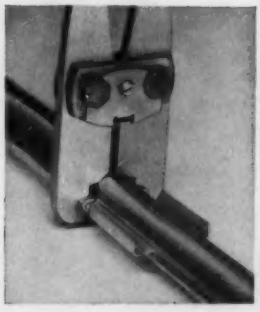
1. Place cable in bottom half of Cablegard (flanges up).



2. Lay top of Cablegard section over cable. Belled ends must match. Sections come straight or pre-curved, fit perfectly.



3. Open tool. Fit tabs into notches in tool jaws.



4. Close tabs—joints are securely locked.

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Time-saving, trouble-saving tips on

Anchoring Lines, Equipment to Plaster or Masonry...

... in this pocket-size handbook by RAWLPLUG, the telephone industry's authority on masonry anchoring. Tells how to fasten cable straps, conduit hangers and instruments *securely* to solid or hollow walls with economical, quickly installed masonry anchors and hand or power drills.

- How to anchor telephone installations without hole-spotting
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- And many other facts to save time and money anchoring telephone equipment to plaster or masonry.

For your **FREE COPY** of this "Masonry Anchoring Handbook," ask your Rawlplug branch or

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230 Petersville Road, New Rochelle, N. Y.

H. B. McKay, TELEPHONY's Electronics Editor, Dies

Harold B. McKay, 53, electronics editor of TELEPHONY, died at his home in San Francisco on Nov. 24, following an illness of several weeks. Mr. McKay had been hospitalized with a heart ailment recently, but had returned to his home shortly before his death.

H. B. McKAY

Mr. McKay became TELEPHONY's electronics editor on Sept. 1, 1956, when he edited the first "TELEPHONY's Electronics Section" which has become a popular feature in the telephone industry and electronics field generally.

Prior to becoming electronics editor of this publication, Mr. McKay had written many articles for TELEPHONY dating back to 1952. Most of his articles presented the first general discussions of various applications of electronic principles in telephony and they drew many requests for reprints from the telephone and electronics industries.

Six of his most popular articles were "Principles of Microwave" (3 parts); "Electrical Principles Used in Carrier Systems" (9 parts); "Voice Frequency Repeaters" (6 parts); "Binary Notation —the Language of Computers"; "Data Transmission" (4 parts), and a series on electronic testing instruments and techniques.

He also authored articles for leading radio, television, and electronics publications.

Following his association with TELEPHONY, Mr. McKay's services as electronics consultant and writer were demanded by operating telephone companies and manufacturers.

Mr. McKay was born Sept. 6, 1906 in San Francisco.

He had a long and varied career in communications, particularly in the telephone field. He had been associ-

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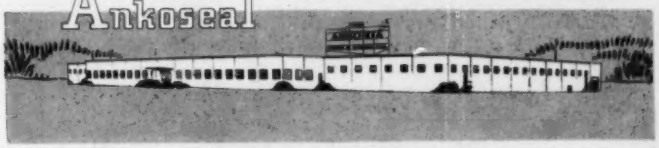
THE ANSONIA WIRE & CABLE COMPANY



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the "power-concentration" tool that revolutionizes light fastening!

With Shure-Set's unique "Power Transfer" design, you can drive pins and threaded studs right through light-gauge metal into concrete with a few strokes of a hammer. The hammer-driven Shure-Set light fastening system is ideal for carpenters, plumbers, electricians, builders, and maintenance personnel for quick, reliable fastening into steel, concrete, or building block... no drilling or cartridge required.

Shure-Set supports the fastener until it is driven home . . . no duds, no bent studs or pins, no smashed thumbs. Try Shure-Set and you'll save time, money, and temper while doing a better job. Look for your Shure-Set dealer under "tools" in the yellow pages.

In addition to hammer-in Shure-Set, the versatile Ramset Fastening System includes Ramset powder-actuated method for heavier fastening, and Ringblaster® heavy-duty kiln gun.

OLIN MATHIESON CHEMICAL CORPORATION — Shure-Set

Ramset Fastening System

WINCHESTER-WESTERN DIVISION • OLIN MATHIESON CHEMICAL CORPORATION
297-L WINCHESTER AVENUE • NEW HAVEN 4, CONNECTICUT

ated with Pacific Telephone & Telegraph Co. since 1925. His early experience included commercial, personnel, and plant. For many years he worked with toll, carrier and television systems in San Francisco.

Since 1920 Mr. McKay had been active in experimental radio operation and construction and manufacture of occasional custom-designed radio units.

From 1945 to 1949, he held a radiotelephone operator's license and did pioneer experimental work on citizen's radio. His work included specially designed television receiving antenna installations.

He was an associate member of the American Institute of Electrical Engineers and the Institute of Radio Engineers and a member of the Seismological Society of America.

Survivors include his three brothers, Stewart, Donald and Kenneth, and a sister, Mrs. Evelyn Hollis; all residents of California.

Rescues 3, Wins LaCroix Award in Pennsylvania

Jack Gauntz of Meyersdale, a combinationman employed in the Somerset division of General Telephone Co. of Pennsylvania, recently received the LaCroix Award for his heroism in rescuing three children trapped in their burning home.

Making the presentation on behalf of the General System was L. F. Shepherd, president of General Telephone Co. of Pennsylvania, Erie. Other company officials attending the award dinner were Frederick C. Rahdert, operating vice president; Charles H. Hess, General's director of personnel; Dwight Zimmerman, general plant manager; and William J. Schilling, Somerset division manager.

Mr. Gauntz was honored for his rescue work of Dec. 18, 1958.

While passing through the village of Boynton, Mr. Gauntz observed smoke rising from a dwelling, and stopped his truck to investigate.

Finding the house, occupied by the James Meyers family, ablaze, he immediately tapped into a telephone line with his test set and called the Salisbury Volunteer Fire Department.

Gauntz then entered the burning home and found three children huddled together trapped by smoke and flames.

He carried the two smaller children, Debbie and Jackie Meyers, 2, and 5, to safety outside, then returned and rescued Jimmy Meyers, 6, before firemen arrived.

Bell Sets Up New Ill. State Area Organization

Springfield has been selected as the executive headquarters for Illinois Bell's new state area organization.

Already an important telephone center, Springfield now becomes the headquarters for all company operations in Illinois outside the Chicago metropolitan area.

This announcement—made on Nov. 19 by H. B. Stair, vice president-operations, Chicago—marks the first time the telephone company has had a major operating headquarters outside of Chicago.

Approximately three-quarters of a million telephones are in the new state area. Geographically, the new Springfield headquarters will serve the company's largest single area.

Illinois Bell President William V. Kahler said, "We long have recognized the growing importance of the area outside metropolitan Chicago. We hope that the location of our new headquarters in Springfield will be an added stimulant to the continued expansion of this vital part of our state."

He explained that Springfield provides a central location for the area to be served by the new headquarters.

The Springfield headquarters organization will be headed by a new general manager, Robert P. Reuss (pronounced "Rice"), a native of Aurora. A former Illinois Bell executive, he recently was assistant comptroller, American Telephone & Telegraph Co.

Mr. Reuss has announced the appointment of five key executives for the new state area headquarters:

Assistant general manager, Warren W. Schmalenberger, formerly Chicago general plant supervisor; chief engineer, Granville P. Brosman, formerly plant extension engineer; general plant manager, Jack B. Gable, who held a similar position with headquarters in Chicago; general commercial manager, Clyde W. Byers, formerly general personnel supervisor; and general traffic manager, John T. Trutter, who was division traffic manager for the south and far west Chicago suburbs.

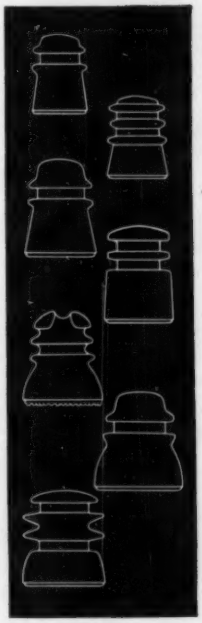
The work of the new organization will be performed by this group, which will have temporary offices in Chicago. When suitable quarters are available, they will move to Springfield and the organization will be enlarged. It is hoped the new headquarters can be set up in the capital in three or four months.

Eternal Change

"The great world spins forever down the ringing grooves of change."—TENNYSON.

NUMBER 45 - *For telephone or telegraph long-line construction. Double petticoat with square groove for firm wire support.*

HEMINGRAY INSULATORS



Easily and Economically Installed

Hemingray Glass Insulators stand up under severe conditions, do not deteriorate, provide the service you need to assure continuous operation of communication lines. The dependability of Hemingray Insulators as proved by their years of sturdy performance is one of the reasons behind their world-wide acceptance.

Hemingray has pioneered many insulator developments to keep pace with requirements, improve communication systems, assure you a dependable source of supply.

The immediate availability of these insulators is further assurance of Hemingray dependability. An up to date distribution system makes Hemingray Insulators available when you want them and where you need them.

Hemingray Glass Insulators are a product of Kimble Glass Company, subsidiary of Owens-Illinois, Toledo 1, Ohio.

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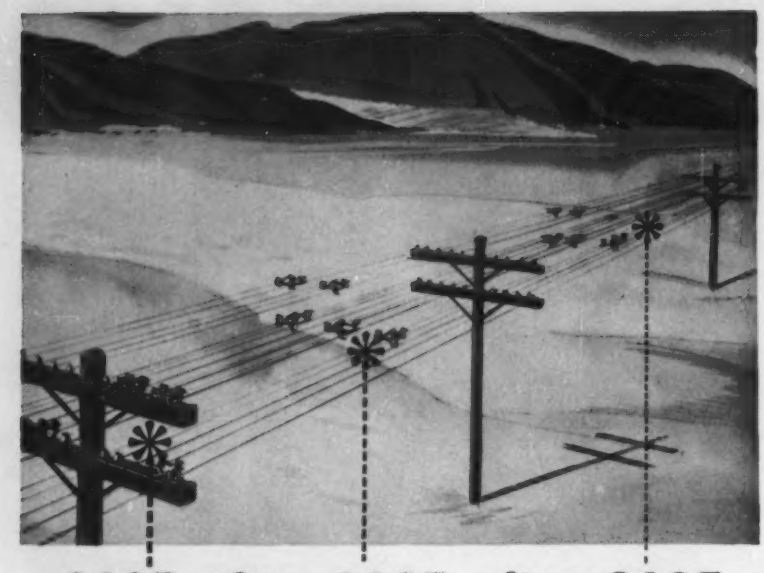

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proved best...world wide

Transposing wires to help expand toll circuits, carrier systems, balance out cross-talk and reduce noise levels has proven itself, installation after installation, throughout the world. Case aluminum Transposition Brackets for cross-arm and span-point transpositions have proved to be the outstanding choice.

- **NEW, IMPROVED DESIGN . . .** the cross-arm mounting slot **now extended to fit all standard 12" and 8" pin spacings.**
- **UNIQUE SPAN-POINT DESIGN . . .** the **only** bracket designed especially for mid-span transpositions . . . eliminates special transposition poles.
- **LIGHTWEIGHT . . .** non-corrosive aluminum cross-arm bracket—4 lbs.*; span-point bracket—3½ lbs.* *(including insulators and bushings)
- **ROLLER SYSTEM . . .** insulators roll, eliminating wire dragging, bracket distortion and protecting wire insulation in stringing.
- **SPECIAL RUBBER BUSHINGS . . .** assures continued communication service in the event of glass insulator breakage.

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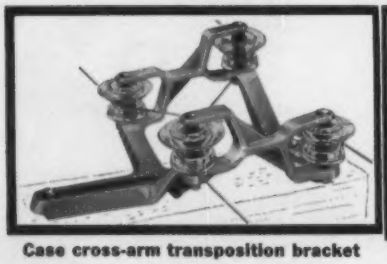
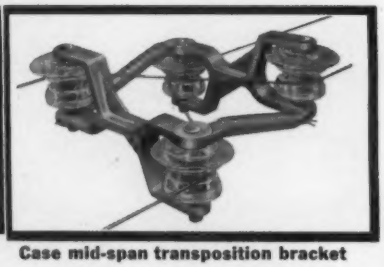


Case cross-arm transposition bracket



Case mid-span transposition bracket

PLANT MAN'S NOTEBOOK

Continued from page 40

near-future effect on the two-letter-five-numeral type of telephone numbers which have been introduced in many Northwestern Bell towns and cities and in hundreds of others throughout the United States. The two kinds of seven-digit numbers will work interchangeably. Both meet the requirements for nationwide dialing.

However, future number changes will be to the Easy Calling Number plan. And, sometime in the future, it is expected that all telephone numbers will be of this new all-numeral variety.

We can only say Amen, and hasten the day!

•

Now that we have atomic-powered submarines and nuclear-powered electric power plants in operation, and irradiated particles are being used in the manufacturer's laboratories, the application of nuclear energy is a reality. However, its use has presented many unexpected and previously unheard of technological as well as biochemical problems.

If you are interested in this subject we suggest that you purchase a 64-page paperback book from TELEPHONY for $1.80, titled: "Effects of Nuclear Radiation on Men and Materials." In this book, Dr. T. Charles Helvey gives a lucid and right-to-the-point explanation of the effects of nuclear radiation on men and materials. This is an eminent explanation of the problems and solutions without recourse to mathematics of any kind.

This book is really a report of research work performed in this field by Dr. Helvey. His presentation is both readable and understandable.

•

The busiest telephone booth in Washington, D. C., is located in the Greyhound Bus Terminal. This is the first in a line of booths in the terminal and the first one that a traveler sees when he gets off one of the 425 buses that arrive or depart from the terminal daily.

The booth takes in an average of $582 monthly. Collections from all pay telephones in the area average out to only $51 each monthly.

•

Crosstalk: Anytime you feel neglected you should think of Whistler's father.

(Plant Man's Quiz appears on page 72.)

WHEN YOU BUY EXIDE YOU GET YOUR "CHOICE"

Exide-Tytex Batteries with Silvium Grids were chosen by General Telephone Co. of Wisconsin for this exchange at Marshfield, Wis. These batteries now feature improved construction that means longer life and greater economy than ever.

No one stationary battery type meets every user's preference. But Exide offers all types . . . and in every case guarantees Exide quality construction and performance. This is an important reason for buying Exide. With no ax to grind for any particular battery, Exide can give you honest information on all types: Exide-Manchex plante type with Silvium corrosion resistant grids, Exide-Tytex with Silvium grids and Exide-Tytex with calcium grids. Available in the widest range of capacities in the field. So choose the battery that meets your needs exactly. Buy from the Exide line. Rectifier and motor-generator chargers available to cover any application requirements.

For complete information on Exide stationary batteries, write for new illustrated brochure. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 20, Penna.

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JUST THE PLIER FOR ELECTRONIC USE

Shear principle requires less pressure.
Pin keeps jaws aligned.
Pointed nose reaches confined space.
Steel jaws hold clipped end tight.
Designed to form loop at wire end.
Coil spring keeps jaws open.
M. KLEIN & SONS
CHICAGO, U.S.A.

Here is a plier specially designed for electronic use. It will fit into confined space and steel jaws hold clipped end of sheared wire firmly . . . nothing to wear out.

The shear blade is at an angle of 15 degrees (the standard angle of regular diagonal pliers). Shear principle assures smooth, continuous action without snap, preventing shock which might damage transistors or delicate components. For use with bare wire up to 18 gauge.

See your electronic supply house or

WRITE FOR CATALOG 103-A

Foreign Distributor: International Standard Electric Corp., New York.

Mathias KLEIN & Sons

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Plant Man's QUIZ

By RAY BLAIN, Technical Editorial Director

Q. What is meant by universal numbering of a telephone system?

A. Universal numbering applies to a multi-office area that has a switch plan which permits the same number to be dialed to reach a given telephone, regardless of the location of the station originating the call.

•

Q. Please advise us what method should be used to connect a ready-access type terminal on paper and pulp-insulated cable.

A. It is suggested that you consider the use of a cable stub recently placed on the market. This stub consists of a section of lead sheathed polyvinyl chloride-insulated 24 AWG cable with a pressure plug (gas dam), factory installed, at the end of the sheath. Each stub is factory-tested to insure that it is gas-tight before shipment.

This cable stub has 26 fully color-coded, PVC insulated pairs which have the cleared ends potted in a plastic cup 13½ inches from the pressure plug. The overall length of the stub is approximately 9 feet. A 51-pair stub of this type is also available.

•

Q. We are considering the purchase of a small trencher for use in our medium-sized exchange and rural area. Will this, in your opinion, prove a good investment for us?

A. As a result of present-day labor costs and the increased use of buried wire and cable construction in many sections of the country, it seems reasonable to assume that the purchase and use of a trencher of this type will pay you big dividends.

This assumption is made, of course, on the premise that the soil and other conditions in your area are favorable for the use of buried facilities.

•

Q. Our company receives frequent requests to provide main-line services to homes located several miles out into the country from our exchange. We should appreciate receiving any ideas you may have as to how this type of service may be provided economically.

A. Various methods are available which may be used to meet the rapidly increasing demand for main line telephone service in rural areas.

If you have a good open wire lead in the area, then the use of subscriber's carrier should probably be your first consideration. Or you may be able to add a rural distribution cable to the existing open-wire line.

If no facilities are available in the area, it may prove desirable to string rural distribution wire on light-weight poles. Fairly long spans may be used which make this type construction desirable and economical. Buried wire and cable should definitely be considered if your area is suited to this type of construction.

•

Q. We have heard of a special telephone designed for use in noisy locations. Can you tell us how it operates?

A. It is believed that you refer to the Gai-Phone which is designed for this purpose. The sidetone on this instrument can be varied from normal to below audibility. In areas of high noise level, the noise picked up by the transmitter and fed to the receiver can be eliminated or reduced to a comfortable level. This permits the user to hear clearly the voice signal coming into that area.

This instrument provides control of incoming (receiver) volume level and output (transmitter) level. This feature permits its use as a terminal repeater station on relatively long lines.

This telephone may be connected to any existing line and can be provided for either dial or manual operation, wall or desk mounting. It is operated in the same manner as a standard telephone. A source of 110-volt, 60-cycle ac power is required for each instrument.

Hansell Assigned to General Telephone Service Corp.

Charles D. Hansell, general transmission and protection engineer for General Telephone Co. of Michigan, is to be assigned to General Telephone Service Corp. staff in New York, effective Dec. 1, as transmission and protection methods engineer, A. T. Jones, director of personnel has announced.

C. D. HANSELL

Mr. Hansell, a veteran of 11 years in the telephone field, began his career with the Federal Telephone & Radio Corp. of Clifton, N. J. as equipment engineer and equipment installation supervisor.

In 1953, he joined General Telephone Co. of Michigan as an equipment engineer, and, in 1955, was promoted to transmission and protection engineer.

He holds a bachelor of science degree in electrical engineering from Purdue University and has had extensive military training.

While in the service, he attended a 10-month college engineering course at the University of Chicago and the University of Illinois in the "army specialized training program."

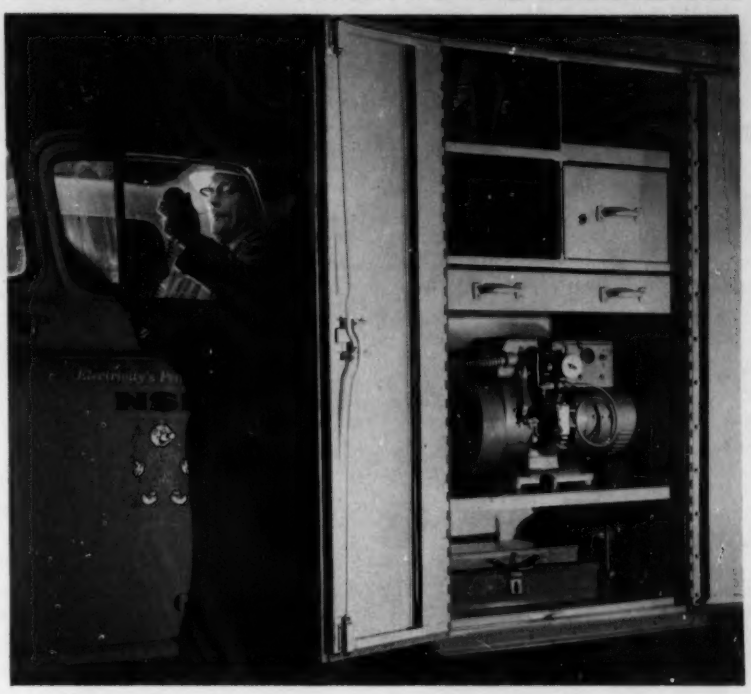
NEMA Announces Election Of New Officers and Board

N. J. MacDonald, of Elizabeth, N. J., president of The Thomas & Betts Co., was elected president of the National Electrical Manufacturers Association at Atlantic City, N. J., on Nov. 13 at the closing session of NEMA's 33rd annual convention.

Mr. MacDonald, a vice president of the association, succeeds J. L. Singleton, of Milwaukee, Wis., senior vice president, industries group, Allis-Chalmers Mfg. Co.

W. C. Wichman, of Chicago, Ill., vice

Onan NEWS REPORT



Built-in dual-purpose electric plant

delivers 2KW for tools and lights; keeps batteries fully charged, too!

Utility construction and maintenance trucks like this one, use two kinds of auxiliary electric power . . . and the Onan Electric Plant provides both. Workmen can plug in on the plant for 2,000 watts of 115-volt, 60-cycle A.C. to operate electric tools like drills, saws, soldering irons and floodlights. Or the plant will deliver 30 amperes of 12-volt D.C. to handle the battery drain of 2-way radio and battery-powered lights.

The Onan's D.C. output makes it unnecessary to run the truck engine to keep batteries charged, making savings in fuel and engine maintenance totaling hundreds of dollars per year per truck.

Leading body builders now install these dual-purpose Onan plants on new vehicles or you can mount them on vehicles now in service. Onan's Vacu-Flo cooling system permits installation within a closed compartment. Where no space is available in the truck body, the plant can be neatly installed over the cab within a handsome weatherproof steel housing.

Dual-purpose utility models are available with either 1,000 or 2,000 watts A.C. Powered by smooth-running single-cylinder Onan air-cooled gasoline engine.

ONAN INSTAPAC

Instantaneous standby power for microwave systems. No interruption of any kind of signal. No moving parts. Can be fitted to existing standby installations.

Call the Onan distributor listed in your phone book or write for specifications.

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How To Get Your Money's Worth From Electronic Equipment!

THE TELEPHONE industry is rapidly taking advantage of new developments in electronics. This is only natural. Since the telephone first came into existence, telephone men have been quick to recognize the value of new developments.

Thus it is not surprising that the industry is using more and more electronic equipment. Mobile radio is used to connect telephones in cars, trucks and other vehicles. Microwave relay links are used in place of wire and cable in many places. Electronic carrier

Carl E. Smith, E. E., President Cleveland Institute of Electronics

circuits and repeaters result in better utilization of existing (and proposed) facilities.

All of these improvements are available today. Tomorrow will see even greater advances. The manufacturers of telephone equipment can be relied upon to give you the kind of equipment you need to fulfill your obligations to your subscribers.

However, you should keep in mind a fundamental principle of management . . . a chain is only as strong as its weakest link. Thus, no matter how big or small you may be, your equipment will not give maximum performance unless it is maintained by competent technicians.

Every company has a technical staff. It may consist of hundreds or perhaps thousands of men . . . or there may be only two or three. These men know and understand telephone technology as it used to be, but in all honesty, do they understand the fundamentals of electronic circuitry?

If they aren't on speaking terms with oscillators . . . rectifiers . . . amplifiers . . . transistors . . . etc., they are not going to be able to give you the technical support you need. A man may be able to wire a central office switchboard in the dark, but if he isn't skilled in the mental tools of electronics, your new equipment will not give you the service you paid for.

In all probability your present staff is very capable. You wouldn't have one which didn't give you the reliability you must have. Therefore they are the logical men to take on the maintenance of electronic equipment . . . as soon as they have received a sound foundation of electronic fundamentals.

This can be done economically and without the loss of valuable man hours by a non-resident training program. Several schools offer this service. They teach your men the fundamentals of electronic circuits. Then, with the ability to understand the principles of any electronic device, your company and the equipment manufacturer have only to conduct a brief orientation of the specialized equipment.

This plan has been used successfully by many companies. It has helped them . . . and it can help you. It will pay you to investigate and get the facts.

For full information on schools providing training in electronic theory and FCC license preparation, write to the National Home Study Council, 1420 New York Avenue, N. W., Washington 5, D. C.

If you would like the details on a "guaranteed" Employers Plan for training technical personnel, write to

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CLEVELAND 3, OHIO

president of General Electric Co., and general manager of the company's Hotpoint Division, was elected vice president.

A. D. R. Fraser of Rome, N. Y., president of Rome Cable Corp., was elected treasurer.

The new NEMA president is also chairman of the industry's annual observance, National Electrical Week, and formerly served as chairman of the executive committee of the National Wiring Bureau—an industry-wide organization interested in furthering the adequate wiring of homes, commercial and industrial structures.

In addition to the election of officers for the coming year, the following new members were elected to the NEMA board of governors:

For Term Ending 1962:

D. E. Allen, vice president — sales, Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y.; John Brown Cook, president, Reliable Electric Co., Franklin Park, Ill.; F. E. Helm, president, The Reliance Electric & Engineering Co., Cleveland, Ohio; Niels C. Miller, president, treasurer & general manager, Miller Electric Mfg. Co., Inc., Appleton, Wis.; P. J. Sullivan, president, Arrow-Hart & Hegemann Electric Co., Hartford, Conn.

Incumbents who have been re-elected to serve for three-year term ending in 1962:

C. W. Higbee, assistant general manager, Electrical Conductor Division, Kaiser Aluminum & Chemical Corp., New York, N. Y.; F. F. Look, president, Allen-Bradley Co., Milwaukee, Wis.; H. C. McElhone, vice president & general manager, The Lamb Electric Co., a division of American Machine & Metals, Inc., Kent, Ohio; and J. W. McMullen, vice president & general manager, Power Equipment Division, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Also J. J. Mullen Jr., president, Moloney Electric Co., St. Louis, Mo.; D. J. O'Conor Jr., president & general manager, Formica Corp., (a wholly owned subsidiary of American Cyanamid), Cincinnati, Ohio; J. L. Singleton, senior vice president, Industries Group, Allis-Chalmers Mfg. Co., Milwaukee, Wis.; Chris J. Witting, vice president, Westinghouse Electric Corp., Pittsburgh, Pa.

Five Areas Expanding Communications Systems

The following news of foreign communications network expansion has been reported recently:

Dial equipment is to be installed in Cairo, Egypt, as well as five other towns on the Nile Delta, under an initial 5-million-dollar improvement program undertaken by the United Arab Republic.

Equipment will be furnished to serve 44,000 subscribers.

In Cairo, 30,000 local lines will be

provided for two exchanges. Local exchange equipment will also be delivered to the towns of Benha, Damanhur, Mahalla el Kubra, Mansura and Tantah in the Nile Delta near Cairo.

Provisions have also been made for the installation of automatic trunk switching centers linking Cairo, Alexandria, and the five other towns. Delivery of equipment is expected in 1960 and installation is to be completed within two to 3½ years.

An Egyptian telephone factory, which will manufacture L. M. Ericsson Telephone Co. products under license, will also be constructed. The Ericsson Group has been awarded the improvements contract.

The factory will produce automatic crossbar exchange equipment, telephones, private automatic exchanges and manual switchboards.

•

Also on the African continent, Ghana plans to install new exchanges and additions to provide service for more than 33,600 new subscribers.

The national trunk network has been strengthened, a *Commerce Weekly* report said, by the installation of VHF multichannel telephone links radiating from Accra to Takoradi in the west and to Kumasi and Tamale in the center and north.

Radio-telephone links are being installed between Accra and Ho and Kumasi and Sunyani. VHF links will be provided later in the northern region.

New automatic exchanges are scheduled for Accra, Tema, Takoradi, Sekondi, Cape Coast, Koforidua and Tarkwa.

A telephone exchange, to be completed in mid-1962, with an initial capacity of 3,000 lines and an ultimate capacity of 10,000, is to be built in Accra.

•

In the Orient, the Hong Kong Telephone Co. will install 22,000 new lines in the colony within the next year (19,000 of these in Kowloon).

Including the ones just mentioned, the company's four-year program of expansion will add 48,000 new lines, 27,000 in Kowloon and the New Territories by November, 1963.

•

Elsewhere, the government of Burma plans to extend its telephone network in Rangoon, and has given an order amounting to $1,150,000 to the L. M. Ericsson Company. The order includes dial equipment for 4,300 lines and the installation of a new telephone exchange for 1,000 lines.

When the extension has been completed, Rangoon expects to have "one of the most modern dial networks in Asia." The network will comprise 13,600 lines of Ericsson crossbar system. A contract was signed in 1954 for automatization of the Rangoon network to comprise 8,300 lines, and this has now been completed.

•

In the Western Hemisphere, The Cable & Wireless (West Indies) Ltd. will expand the telecommunications system of the Federation of the West Indies at an estimated expenditure of 2 million dollars, it is reported.

The chief items in the West Indies project are:

A radio link between Trinidad and Barbados and beyond.

A new wireless transmitting station and a new central telegraph office in Jamaica for Trinidad and Jamaica and Belize.

Telex to New York.

New service to Nassau.

Additional telephone channels to Miami and Barbados.

A VHF network connecting all company branches on the Leeward and Windward Islands, with three telephone channels on each link.

Introduction of telex on completion of the new installation linking Trinidad and Jamaica and Barbados.

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BEST for restaurants
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attracts the eye day or night,
promotes more revenue. Colorful, clean, sturdy –
the BN Booth is best for you, too!
For full particulars, consult your distributor or write direct for folder... Benner-Nawman, Inc., 3421 Hollis Street, Oakland 8, California.
a B-N booth is a busy booth!

ABC OF THE TELEPHONE

Continued from page 22

(4) Ease the pulling board over the first crossarm.
(5) Stop the pull when the pulling board is about 10 feet beyond the first pole.
(6) Place each wire in its respective pin position.
(7) Pass the tow line over the next crossarm.
(8) Restart the pull and ease the pulling board over the next crossarm.
(9) Stop the pull when the pulling board is 10 feet beyond the second crossarm.

The cycle continues until the complete section is pulled into place. Then the starting end is dead-ended or spliced to the wires being extended. The section is pulled to correct sag and tension, snubbed at the far end and tied. Wire ties that grip the line wire well enough to keep the wire from sliding under unequal load conditions generally eliminate the need for a temporary dead-end.

Temporary head guys can be used to advantage to reduce the unbalanced load on the poles along the line—especially on the poles at the ends of each section.

Just how the wire is pulled depends almost entirely on conditions found on each individual job. Certain natural hazards, such as rivers, highways, or railroads, may establish logical places to start the pulling or paying-out operations. One pulling section can end and another section can start at a secondary road crossing.

An alternative to permit pulling past a crossing without starting a new section would be to tie a rope screen or net between the poles on either side of the crossing. A rope screen or net has advantages because it can be removed and reused at another location as soon as the wires are tied in place at the crossing.

The wire must be kept under control where the pole line changes grade. A good example is a pole line dipping into a valley or climbing a hill. The wire might be pulled high above the crossarm and come in contact with overhead

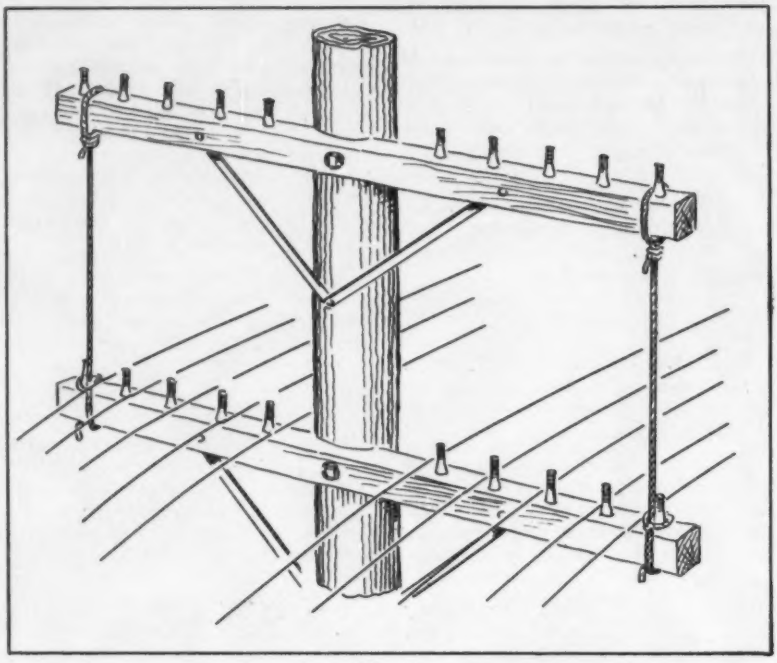


Fig. 5

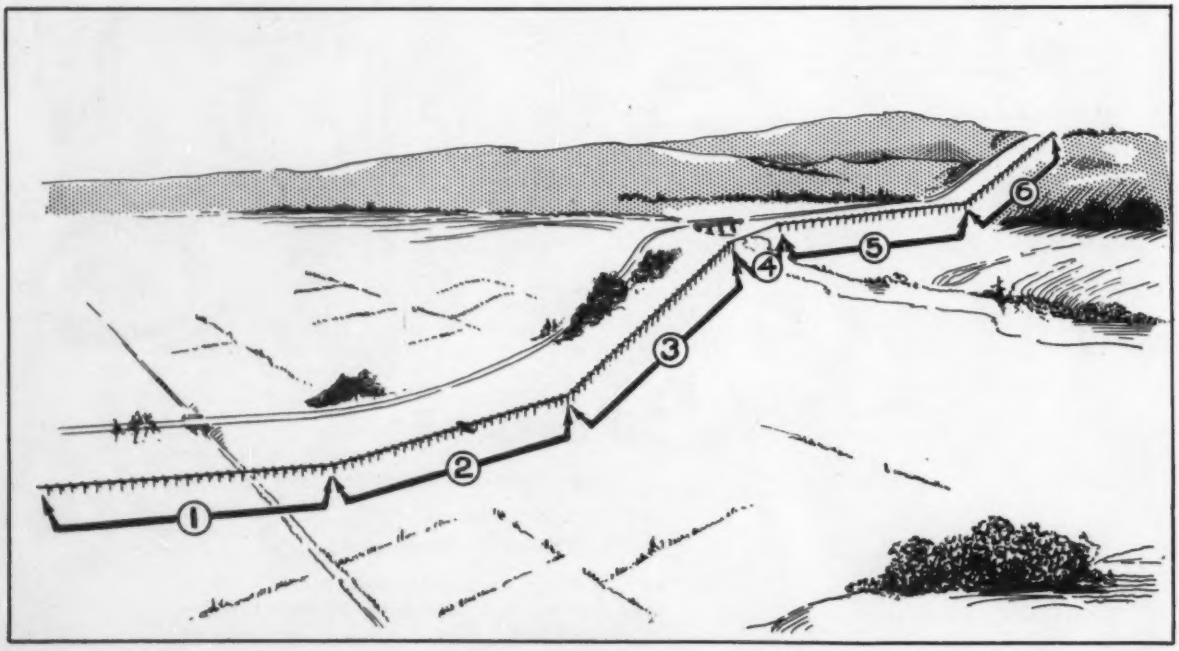


Fig. 6

power wires if it were uncontrolled. One way to prevent the wires pulling away from the crossarms on a down grade is to place the wires under every other crossarm. A better way is to place the wires over all the crossarms. Then, at each crossarm, where there is an up pull, tie a length of rope over the wires. Tie the rope near the pole and at the end of the crossarm. This forms the top side cradle or sling, illustrated in *Fig. 4*, and prevents the wires from raising above the crossarm.

An alternate method of preventing up pull, when there is a telephone crossarm above the arm on which the new wires are being placed, is shown in *Fig. 5*. A piece of rope is tied between the ends of the two arms to confine the new wires to the space in between.

The temporary rope ties illustrated in *Fig. 4* and *Fig. 5* can be removed when the new line is tied to the insulators.

Laying Out the Job

A number of factors must be taken into consideration during the planning or laying out of an open wire installation job. Some of the basic factors are:

(1) Size of the job.
(2) Physical characteristics of the pole line.
(3) Number of men available to do the job.
(4) Amount and type of equipment that can be used on the job.
(5) Accessibility of the job.
(6) Traffic conditions along the right-of-way.

A particular job may be small, medium, large, or any one of many degrees between these broad descriptive classifications. The size of the job can be measured by the length of the line to be placed, the number of wires to be placed, or by the apparent ease or difficulty of completing the work.

A line run through relatively flat country usually presents fewer problems than would be encountered in hilly or mountainous country. The number of corners in the line and the amount of pull at the various corners will also come into consideration. Often the better plan is to work from both directions toward a rather difficult corner. This would have advantages compared to starting at one side and working up to and beyond the corner.

The size of the line crew available for the job will determine whether the job is handled on a section by section basis, or whether a number of sections will be handled simultaneously. Two or three men working with a small amount of equipment will usually accomplish most working as a crew or team. A large number of men and a

Transite's installed cost is less because your crews spend virtually all of their time with the actual installation of duct.

Now–save 5¢...10¢... up to 15¢ per duct foot!

Here's why Transite Telephone Ducts offer these substantial savings in installed cost!

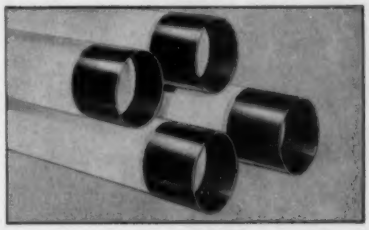
In virtually every part of the nation installations of Transite® Telephone Ducts are at a new high!

Why? For the simple reason that no other material offers so many practical advantages . . . with each contributing to lower *installed* costs. In fact, savings can run as high as 15¢ per duct foot!

With Transite you're working faster, easier . . . with smaller crews. For there's no complex joining and difficult positioning. Instead, the 10' Transite lengths are easily handled by one man. And the plastic coupling used with Transite makes a tight joint that goes together in seconds . . . stays tight for the life of the line.

More time and labor are saved in splaying...curving...bypassing...and in manhole connections! Every one of these on-the-job requirements is met with a minimum of "extra" in time and material.

With Transite you have fewer items to stock, less warehousing, lower inventory costs. There's less handling of material all around. As for breakage, there's practically none. Savings are substantial.



Write today for brochure TR-239A, "Transite Telephone Ducts." It gives complete information on why Transite's installed cost is lower . . . as well as why it reduces future costs in cleaning, rodding and repair. Address Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ont.

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RESULT: UNQUALIFIED APPROVAL.

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RESULT: All BOOTHETTES are shipped with UL seal of approval.

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correspondingly large amount of equipment generally should be divided into smaller groups, with each group at work on separate sections of the line.

Accessibility of the various parts of the pole line will have an important bearing on the delivery of material to the job and the placement and use of construction equipment.

Traffic along the right-of-way and at crossroads has been mentioned previously because of the safety hazards involved. These conditions may also be of some significance in planning the job. Highways simplify the problem of getting material and equipment to the job. Care must be taken to be sure that reels are set up and work is performed out of the way of traffic.

The amount of wire to be pulled over a highway, or railroad, or under a power line should be held to a minimum. Wire is easiest to pull down hill. As a result, the job will go better whenever the reels can be placed at the top of a hill. The hilltop location is preferable compared to a location in a valley, or at the bottom of the hill, where the wire must be pulled up to the top.

The amount of wire that can be placed in one pull will be controlled by one or a number of the factors previously discussed. The amount of wire in a single coil is a good objective for a single pull when other conditions permit that amount of wire to be placed from one set up point. A standard coil length may vary from 2,200 to 4,600 feet, depending on the type and size of the wire.

The length of a section of line to be pulled from a particular reel location may also be governed by the location of corners in the line. The amount of pull at the corner must be considered. A corner with less than 15 feet of pull may be fairly easy to negotiate. As the amount of pull becomes greater the angle of the corner increases. This may add sufficient problems to warrant terminating one section at the corner and resetting the reels to start another pull in the new direction.

Corners or changes of direction in the line generally are rather widely separated. The line can be divided into sections—working in both directions from each corner—where these conditions exist. This is a practical solution to the problem of pulling lines at corner poles.

Splicing open line wires is very easy. The line is as strong through the splice as through a section of wire. As a result, the necessity of making a splice can be discounted and the planning can be concentrated on laying out the job so the wire is easiest to pull.

The number of wires to be pulled will also have a bearing on the length of a pulling section. Two or four wires are easier to handle than eight or 10. Thus, an average pulling section for two or four wires would most likely be longer than for eight or 10 wires.

A number of the factors involved in planning the placement of open wire on a large job are present in the section of line shown in *Fig. 6*. The portion of the line covered in the aerial view covers about four or five miles. Obviously there are a number of good ways to handle a job such as this. The way described here, while it may not be the only way to do the job, illustrates how work can be saved by giving consideration to the various factors involved.

Six pulling sections are indicated on the illustration. The smaller county highway on the left divides Sections 1 and 2. A corner pole separates Sections 2 and 3. Section 4 crosses the river and Section 5 ends at the bottom of the hill in the distance. Section 6 extends from the bottom to the top of the hill.

The natural factors involved in laying out the pulling sections and ways to simplify the pulling job have been considered in drawing up the following pulling sequence:

STEP 1. The reels are set up on the left and Section 1 is pulled. The wire crosses the county road in this section because, by being at the end of the pull, the wire can be snubbed on each side of the road to maintain adequate clearance.

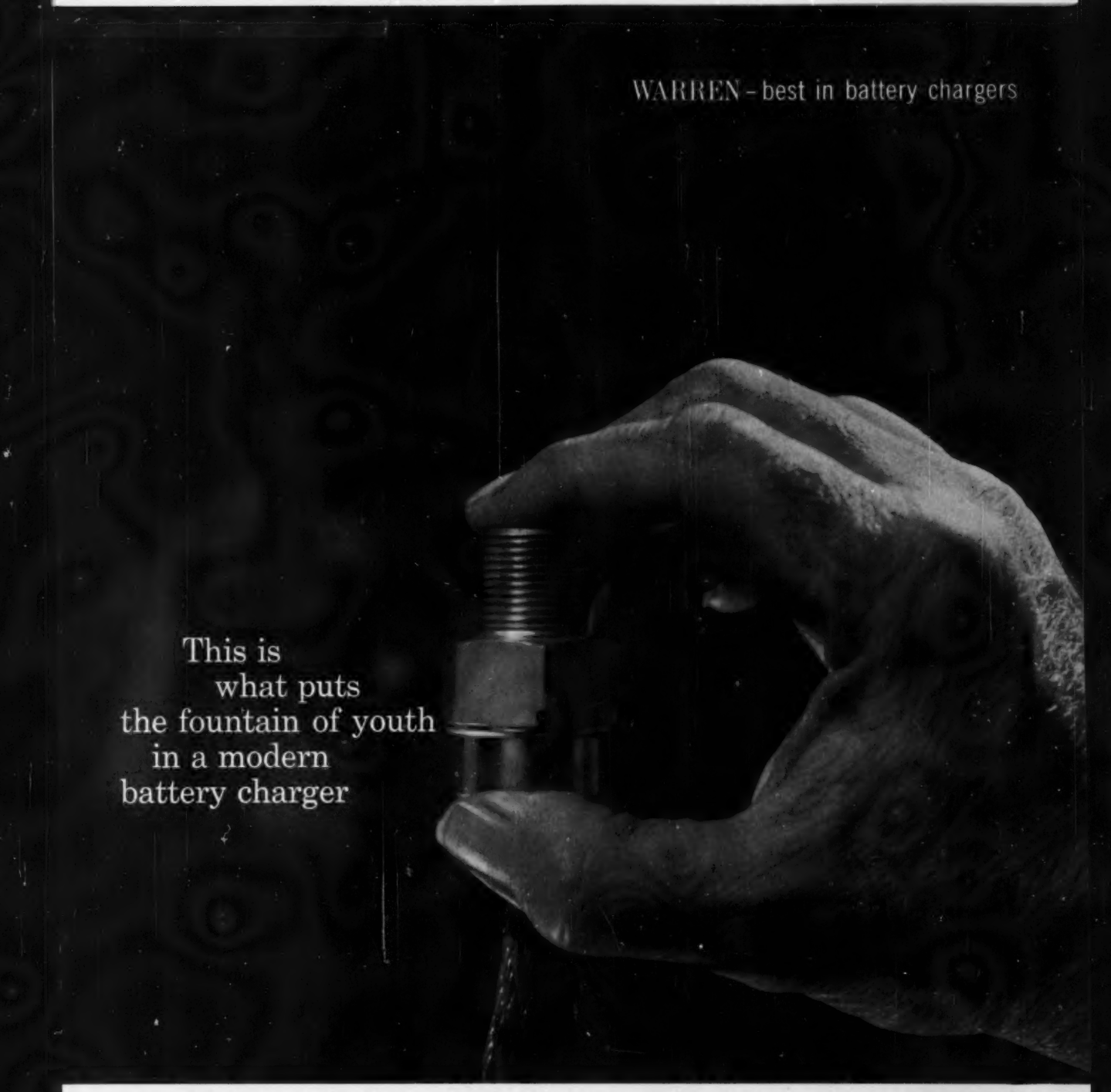
STEP 2. Move the reels to a location at the corner between Section 2 and Section 3. Pull the wires both ways from this one reel set up.

STEP 3. Move the reels across the river and pull Section 4 and Section 5.

STEP 4. Move the reels to the top of the hill and pull Section 6 down the hill. Pull the next section down the other side of the hill or along the ridge of the hill, as the case might be.

"GONNA' CLIMB THE INSIDE OF A HOLLER TREE, YOUNG MAN?"

WARREN - best in battery chargers



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(We prefer to call them TFR's, or Transistor Float Rectifiers, but back to the subject).

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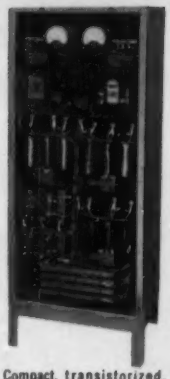
They have, if you will, a certain *character* about them — and what it all means is that they help make possible a level of dependability and maintenance-free operation that makes the Warren TFR's unique.

Even if you're not in the market at the moment, you should find out more about Warren TFR's. You never can tell when you might be able to put the mint-fresh information we send you to very good use.



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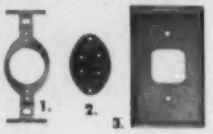
SE-43A Junction Box, 45c | SE-60 Mounting Ring* | SE-493A Oval Jack $1.30 | SE-16B Face Plate*

*SE-60 and SE-16B, 45c

Modern Plug and Jack Assembly

Latest telephone practice calls for use of the SE-63A (open) junction box, SE-60 mounting ring with oval SE-493A jack, and one of several types of the SE-16 series face plates. The SE-63A junction box screws into vertical wall studs (2"x4" or other) and accepts the hardware assembly as above.



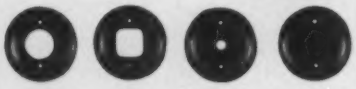
1. SE-43A Bracket 30c ea.
2. SE-493A Oval Jack $1.30 ea.
3. SE-19B Plate 28c ea.

Modern flush outlet installation utilizing SE-19B standard face plate, SE-493A oval jack, and SE-43A bracket holed for standard conduit box.

Face Plates

45c each, including SE-60 mounting ring and screws.

SE-19B



SE-16A | SE-16B | SE-16C | SE-16D

Five styles of face plates are available. SE-16A takes SE-47C multi-service, 12-terminal connecting block; SE-16B takes SE-493A jack; SE-16C for permanent phone; SE-16D for undecided service; SE-19B accepts SE-493A with SE43A bracket, or, SE-404B jack with SE-44 bracket for flush mounting.

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Courts and Commissions

OK Purchase, Dial Rates, Financing, Service in Neb.

The Glenwood Telephone Membership Corp., Blue Hill, was authorized by the Nebraska Railway Commission on Nov. 13 to purchase the properties of the Upland Telephone Co. and the Campbell Telephone Co. (TELEPHONY, Oct. 10); to establish monthly rates to become effective with the conversion of these exchanges to dial operation on or about Dec. 1, 1960; to issue securities to the REA in the amount of $296,000 to finance the improvement program.

Also approved was an agreement with the American Communication Co., Belleville, Kan., for the establishment of firm boundary lines between the exchanges of the two companies to prevent overlapping and duplication of service.

Extended area service will be discontinued between Campbell and Upland and between Upland and Macon. Evidence indicated that the majority of subscribers of these exchanges would be benefitted by the lower service rate which the discontinuance of such extended area service will allow, and that toll service will be adequate and sufficient.

Local exchange rates were approved for Upland and Campbell as follows:

One-party business	$8.75
Two-party business	8.00
Rural multi-party business	6.75
One-party residence	5.75
Four-party residence	4.50
Rural multi-party residence	4.75

Two N. Y. Companies Granted Rate Increases

The New York Public Service Commission recently approved the following two rate increases:

Tri-State Associated Telephone Corp., Johnstown, was allowed to raise rates, effective Nov. 26, by $57,350 yearly.

The Tri-State company serves 7,400 stations through exchanges at Port Jervis and Barryville.

It had originally asked for rate increases amounting to $85,600. The commission determined that such increases would have been excessive. As a result, the company submitted this new filing.

The Tri-State company said it expected that its operating expenses for the next 12 months would exceed those for 1958 by about $85,000.

•

The Midstate Telephone Co., Inc., Manlius, was given permission to raise rates at four exchanges effective Dec. 1.

These exchanges are Central Square, Brewerton, Munnsville and West Winfield. However, the commission did not allow a rate increase at Manlius.

The company provides dial service to more than 5,700 stations.

A rate increase amounting to $51,250 had been sought, but excluding the proposed raise at the Manlius exchange, an increase of $40,850 was allowed.

The company said that it expected an upswing in operating expenses over 1958 of approximately $60,000.

The Manlius exchange serves about 1,935 stations. Its subscribers have extended area service with Syracuse subscribers of the New York Telephone Co. At the present time, Manlius rates are the same as Syracuse rates.

Georgia Company Allowed Rural Service Raise

The Darien Telephone Co., Inc. on Nov. 10 was authorized by the Georgia Public Service Commission to raise its rates for rural service to offset losses accruing from the elimination of mileage charges.

The company, which also received approval for a $560,000 REA loan, had sought to increase its rates for other classes of service as well.

Presently, the company offers dial service at its Eulonia exchange and plans to convert its Darien exchange to dial. At that time, extended area service will be offered between the two exchanges.

The commission estimated that under the company's new rates it will have total operating revenues of $87,094, giving it a net operating income of $20,666. This sum, the commission said, together with cash available from depreciation accruals will be adequate to meet annual payments of $23,559 for principal and interest on the REA loan.

The commission previously had approved rates effective on conversion to dial service (TELEPHONY, May 18, 1957).

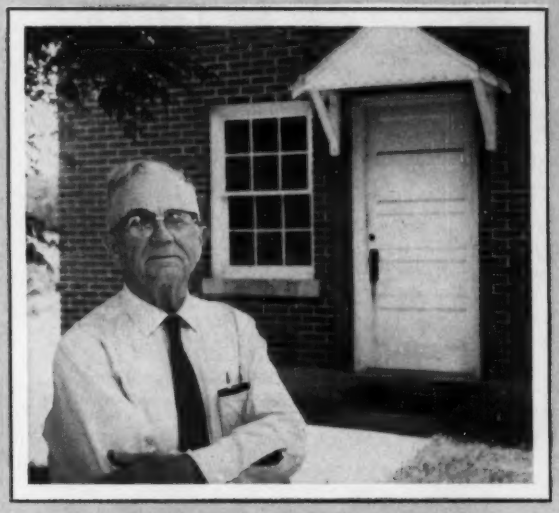
RAYTHEON

in the power field

NEWS ABOUT RAYTHEON TELEPHONE POWER SUPPLIES

Raytheon Company, Industrial Apparatus Division, Manchester, New Hampshire

RAYTHEON RECTICHARGER STILL IN SERVICE AT PEOPLE'S MUTUAL (VA.) AFTER 20 YEARS



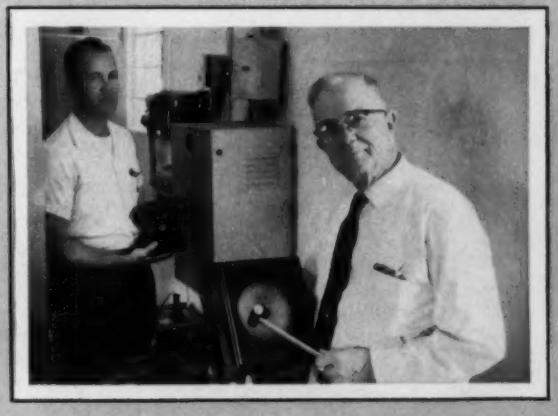
Mr. E. B. FITZGERALD, president of People's Mutual Telephone Company with headquarters at Gretna, Virginia. The company founded by Mr. Fitzgerald's father 80 years ago serves over 1,600 subscribers in Gretna, Hurt and Renan, Va. Raytheon battery chargers are used in each of the three central offices.

Unit installed in December, 1939 when 80-year-old-company switched to dial

"Ours is a concern that grew from the most humble beginnings", explains E. B. Fitzgerald, president of People's Mutual Telephone Company, now headquartered at Gretna, Virginia.

Mr. Fitzgerald goes on to explain that his father established a primitive communications system between his home and office some 80 years ago--the first installation using a large box-like diaphragm which acted as both mouthpiece and receiver.

When the company converted from magneto to dial in December, 1939, a Raytheon Recticharger was installed. Since that time, Mr. Fitzgerald reports, "despite the fact that our subscriber list has grown over fourteen times, the 3-ampere, 50-volt battery charger has performed its task with top efficiency, without failure or maintenance problems". Each of the company's three central offices is now equipped with a Recticharger.



E. B. FITZGERALD and E. B. JR. compare modern dial telephone with early telephone instrument used by the elder's father 80 years ago. The senior Fitzgerald demonstrates an early method of "ringing" by striking the diaphragm with a rubber hammer to attract the distant party. The twenty-year-old Raytheon Recticharger is on the wall between them; batteries are at bottom left.

To learn about the Raytheon 1960-model telephone power supplies introduced at the U.S.I.T.A. convention, please write to Raytheon Company, Manchester, N. H., for the latest product data.

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These rates, the same for both exchanges, are in effect at Eulonia and are scheduled to go into effect at Darien when cut-over is completed.

The company had sought an increase in dial rates as follows:

	Present	*Proposed*
One-party business	$6.50	$6.50
Two-party business	5.50	5.50
Four-party business	4.25	4.50
One-party residence	4.25	4.50
Two-party residence	3.50	4.00
Four-party residence	3.00	3.50
Multi-party rural business	4.25	5.50
Multi-party rural residence	3.25	4.00

The commission approved a raise in multi-party rural business rates to $4.75 and for multi-party rural residence rates to $3.50.

Fla. High Court Upholds Commission Decision

The Florida Supreme Court on Nov. 13 upheld a rate increase of approximately one and one-half million dollars granted the General Telephone Co. of Florida in April (TELEPHONY, Apr. 18, 1959).

The company had challenged the Florida Railroad & Public Utilities Commission decision on the following grounds:

(1) It lumped together interstate and intrastate operations in arriving at the amount of the raise.

(2) A just and reasonable return on investment was not given and the commission reduced the rate base by applying income tax accrual lag against working capital requirements.

The court held that the commission had erred in its first finding in the case, because it had combined interstate and intrastate operations. But, the court said, the commission subsequently had reviewed the case and properly separated the two.

The judges unanimously held that the rates allowed provided "a just and reasonable rate of return."

Set Telephone Answering And Other Neb. Rates

Several orders were approved by the Nebraska Railway Commission on Nov. 10 and 13, as follows:

Rural residence and business rates, at $4.50 and $5.50, respectively, were established for the Ponca Telephone Co., Blair. Formerly, all rural subscribers were served on a service station basis. Several are now requesting the company to build lines and provide service as company-owned stations.

•

Rates were approved for the General Telephone Co. of Nebraska, Columbus, for additional items of equipment used in connection with answering and recording service. The monthly rates and non-recurring charges are as follows:

	Non-Recurring Charges	*Monthly Rate*
"Electronic Secretary" (DCR) complete with answering disc and recording wire spool	$15.00	$15.00
Answering disc, additional	2.50	—
Recording wire, each additional spool	4.00	—
Tape adapter (TA) for above Electronic Secretary used in place of record player for repeated and varied personal announcements — additional charge	5.00	6.00
Remote callback (RC) and oscillator which permits the option of getting recorded messages from remote station without having to return to location of machine	5.00	6.00
Oscillator (OCS) additional, each		.50
Alarm timer (AT) external signal when recording wire is nearing capacity	3.50	.75
Heating element (HT) plug in type for cold locations	3.50	.75
Headphone set (HDPH)	3.50	.50
Voice control adapter and jack (VC) permits the recording on incoming call for any period up to one hour, controlled by calling party	3.50	1.75
Foot control and jack (FC) for transcribing in playback	3.50	1.25
Answering unit only (TT) using endless tape for own announcement up to 3 minutes	15.00	10.00
Answering unit only (TR) using pre-cut disc for own announcement	10.00	6.00
Monitor recorder (MR) with one hour tape and beep tone for monitoring and recording telephone calls	10.00	10.00
Move, inside (for all above basic machines)	5.00	—

•

The application of Joseph L. Conroy, McCook, to receive telephone service from the McCook exchange of the Northwestern Bell Telephone Co. was denied by the commission. Evidence showed the applicant had lived at his present location for 43 years within the exchange area of the Indianola Telephone Co., Inc. and had received no telephone service during this time. The Indianola company's lines run past the applicant's home and dial service has been offered for the past two years. The applicant had not, as required by law, established that he cannot receive adequate service from

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•

In another commission action, The Northern Telephone Co., Blair, was given permission to establish a monthly rate of 25 cents for color telephones to be charged in addition to the regular rate for the class of service furnished. Also approved were non-recurring installation charges as follows: $2.50 for a business extension, $1.50 for a residence extension, $1.50 for a business extension gong, horn or bell, and $1.00 for a residence extension gong, horn or bell.

Hear Two Sale Requests, One Wis. Rate Adjustment

The Wisconsin Public Service Commission on Dec. 3 was to have heard the joint applications of the Modena Cooperative Telephone Co., Inc. to sell, and of the Nelson Telephone Cooperative, Inc., Durand, to buy and take over the Modena company's operations.

•

On the same date, the commission was also to have heard the joint applications of the Gilmanton & Dover Farmers Telephone Co., Gilmanton, to sell, and of the Nelson Telephone Cooperative, Inc., to buy and take over its operation.

•

On Dec. 4, the commission was to hear the request of the Amberg Telephone & Telegraph Co., Wausaukee, for authority to change the rates of subscribers acquired by the purchase of the Harmony Telephone Co.

Rule N. C. Railroads Cannot Interconnect with S. Bell

The North Carolina Utilities Commission, in a split decision on Nov. 25, ruled that railroads have no right to interconnect their communications systems with those of telephone companies, except in cases of emergency.

The decision was handed down in connection with a complaint which the Southern Railway had brought against Southern Bell Telephone & Telegraph Co. over a new tariff in which Southern Bell said it would permit interconnection, only if the railroad's facilities were less than 50 per cent microwave.

Under an agreement that dates back to 1924, Southern Railway has interconnected its facilities with those of Southern Bell at three points along its lines in North Carolina — Charlotte, Greensboro and Asheville.

It protested against the new tariff filed by Southern Bell and contended that it should have unlimited intercon-

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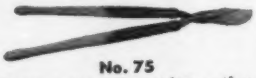

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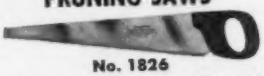

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nections, because they are necessary for efficient operation of the railroad.

In its order, the commission found that Southern Bell's tariff is "unreasonably preferential" to Southern Railway and noted that other right-of-way companies, including power and gas firms, are not offered interconnections.

The order said that the telephone company's effort "to gradually eliminate all interconnection privileges, except in cases of emergency" is not in the proper interests of either party, and that Southern Bell should not restrict the use of wireless communications by the railroad. "On the other hand," the order stated, "as microwave develops, we do not believe Bell should reasonably be called upon to provide interconnection privileges for all companies having these facilities."

"Thus, we believe a distinction in the treatment of railroads based upon the historical wire facilities tied to the railroad's rights-of-way is now unreasonably preferential."

The majority decision was written by Commission Chairman Harry Westcott.

However, Commissioners Richard Long and Clarence Noah dissented.

Long said "There is a clear distinction which may be drawn between the need of a railroad for the service here at issue, and the needs of other right-of-way companies. Certainly, there is no evidence here to indicate a similar need by the others."

He said the effect of the order is "economic waste," and that "this is carrying the protection of one utility too far at the expense of another."

He said the compromise plan by Bell "recognizes an equitable estoppel as to the lines presently built and in service."

Long's dissent, signed by Noah, said, "I think what is at issue here is dollars. I do not suggest that it is an improper issue, nor do I see any particular reason not to regard it as the principal issue.

"Bell is apparently genuinely concerned about the possibility of a large scale use of microwave, which, if connected by substantial numbers of customers into Bell's local facilities, would clearly eliminate much of Bell's total revenue."

Approve Two Purchases; OK Cut-Over in Missouri

The Kingdom Telephone Co., Auxvasse, on Nov. 12 was authorized by the Missouri Public Service Commission to purchase two companies, the Americus Mutual Telephone Co., and the Bigspring Telephone Co., and convert them to dial service.

With these purchases, the Kingdom

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Enables Carrier and Line Check at both 1000 Cycles and Carrier Frequency.

Set consists of TRANSISTOR OSCILLATOR Model J, DB METER Model K, Case and Leads.

TRANSISTOR OSCILLATOR MODEL J — Voltage output, O, -13, -16 DBM Frequency, 1000 Cycles; Output Impedance, 600 Ohms; Power, Self contained 700 hour mercury battery. Stable in frequency and voltage.

DB METER MODEL K — in 4 ranges from -20 +42 DBM. DB Scale, red; 1, 5, 25, 125 Volts. Scale Black. Frequency response, up to 600 k. c. Minimum impedance, 18 K Ohms. Self contained loads, 150 and 600 ohms. LEATHER CASE with space for Lead Sets.

LINEMAN'S TEST SET

MODEL H — STANDARD FOR 40 YEARS. For open wire testing. Don't cut wires or skin off insulation. Lamp for locating distance to fault. Talking circuit.

STEWART CABLE TESTER

MODEL L—SIMPLE TO USE. SAVES TIME. More accurately locates cable faults. Only tester with "tone-test" features and fishtail exploring coil with neutral pickup coil and head-phone.

SPEED CABLE TESTER RESULTS by using the EXPLORING COIL AMPLIFIER, MODEL E. Increases Head-phone tone more than 100 times. Pocket Size.

STEWART BROTHERS
Division of Instrument Laboratories
315 W. WALTON PL., CHICAGO 10, ILL.

company adds service to an additional 350 subscribers, and has a total of more than 1,000 subscribers.

The Kingdom company operates exchanges at Auxvasse, Mokane, and Hatton, and through Mokane, serves Portland and Steedman. The Auxvasse exchange also serves Williamsburg.

N. Y. Independent Granted $10,000 Rate Increase

The Port Byron Telephone Co. was given permission by the New York Public Service Commission to raise its rates effective Dec. 1.

The company serves about 560 stations through its Savannah exchange and 1,040 stations through Port Byron.

Installation of new and expanded central office facilities is planned for the Port Byron office and Savannah is being expanded.

The company said that its expenses for the coming year will exceed those of 1958 by about $10,000, which is approximately the amount of additional revenue allowed.

Cuban Rebels Move In On ITT Subsidiary

What can happen to an American firm in Cuba under the revolutionary regime of Premier Fidel Castro is told in the story of the Cuban Telephone Co. since it was "intervened" eight months ago, published in various U. S. newspapers.

The Cuban Telephone Co., Havana, the biggest American investment seized so far, is in the eighth month of "intervention," and conditions are gradually getting worse, it is reported.

Intervention of the company started last March under the new rebel laws passed after the fall of the Batista dictatorship. This is the first step in an involved process leading to eventual expropriation.

The Cuban Telephone Co. is said to be worth some 125 million dollars. The International Telephone & Telegraph Corp. owns 65 per cent of the stock; the remainder is owned by Cuban investors.

Since the seizure of the company, all American employes have been discharged by the rebels and sent home—all except I. W. Gleason, who is vice president in charge of operations.

Mr. Gleason has been largely relieved of his responsibilities, as the "interveners" even read and answer his mail. However, he is permitted to sign notes for loans.

The telephone company was the first, and remains the largest, company taken over by the Castro government. Enrique Ozacki Oltuski, minister of communications under Premier Castro, made the seizure when he took over in January.

Oltuski sent a squad of heavily armed rebels to the company's Havana offices. They were led by a former employe of the company, Roberto Lastros, who told Mr. Gleason:

"We're taking over for 30 to 45 days while the government prepares its expropriation proceedings. Meanwhile, I am the boss." During the eight months that Lastros has remained "the boss," he has taken these actions:

(1) Re-established the 5-cent telephone call rate that had been in effect from 1909, and which was raised last year by Batista to ten cents. The rebels contended that this was a deliberate attempt to rob the poor.

(2) Increased the number of company employes, with backing from the Castro controlled telephone labor union.

(3) Discharged all the experienced executives and replaced them with men said to be more sympathetic to the revolution.

(4) Permitted the union to order telephone service stopped in various protests.

The Cuban company is now completely under the control of the rebels. Mr. Gleason's four American assistants have been sent home, yet the rebels have depleted company reserves by padding payrolls.

It is reported that the company owed about $25,500,000 in loans. Those now directing have been trying to arrange a 15 million-dollar loan locally in order to meet the greatly increased operating expenses brought about through rebel actions.

Mr. Gleason refused to sign a note to apply for the 15 million-dollar loan, despite the fact that friends advised him he might be ordered out of the country as a result of this disagreement with the rebels. In an effort to continue providing telephone service, this is said to be his only argument, thus far.

The Cuban rebels have refused to allow meetings of the board of directors. They have issued no dividends to the shareholders. Company finances have been adversely affected, it is said, because, whereas American telephone companies average 12 employes for every 1,000 telephones, the rebels now have 35 workers for the same number of instruments.

The Cuban Telephone Co. has about 185,000 telephones, and there is a long waiting list of applications.

It is reported that in recent months, the rebels have bought a number of recording machines, each capable of taping eight or more telephone conversations simultaneously. All overseas telephone calls are now monitored in this way, although it is not known how soon the tape is played back.

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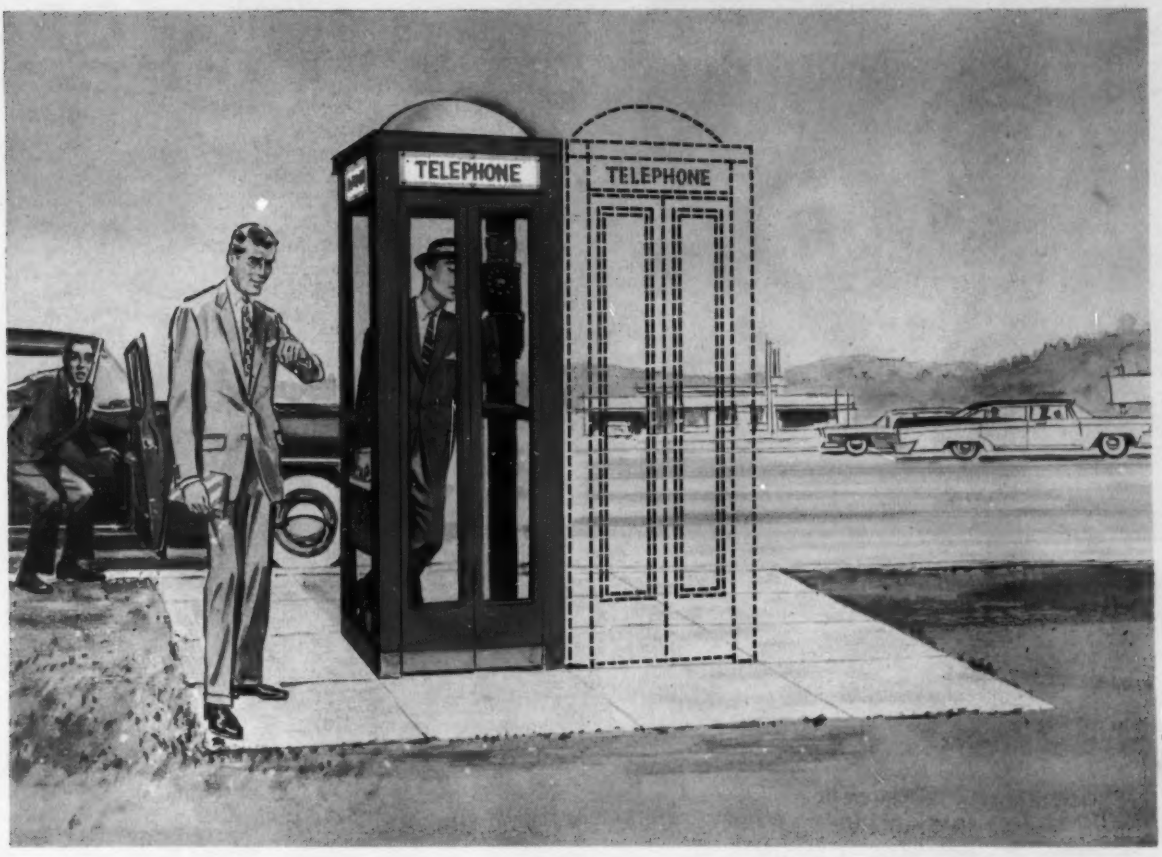
Add a booth, or more...
when, where, and as called for...



There's no percentage in a lone booth in a heavy traffic location.

The public suffers and so does telephone company income.

Where a second or third booth is indicated, Sherron standardization makes the installation of additional booths practical, easy and profitable.

Provide for possible, even probable expansion of single-booth installations by specifying Sherron multiple outdoor or "See-thru" indoor telephone booths . . . standardized for simple, economical additions in the field to form a continuous and uniform multiple. This is possible only with Sherron steel booths . . . thanks to Sherron construction.

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There's a Sherron booth for every location and budget in either zinc coated steel or stainless steel.

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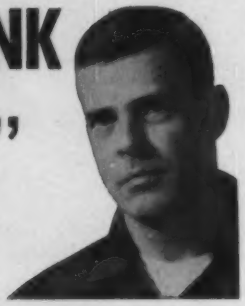
"Know What a HINK is?"



Chuck Bradley
Osmose Forester

I didn't—until the other night when I ran across it in an old text book. "A hink is a hook used for reaping."

The reaping we do on our brush control jobs is done with our own special basal selective spray method. This knocks out the high-growing species that cause you trouble. At the same time, a great deal of care is taken to leave low-growing plants that protect against possible re-invasion of undesirable seedlings. By following this method, savings are also realized through the reduced need for expensive chemicals.

If you got "hinked" on the last job where someone tried to kill everything in sight—let us explain our unusual method.

Chuck Bradley

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ANSWERING DEVICES CONTRIBUTE TO SUCCESS

Continued from page 32

mowers. Quite frequently when the telephone rang, one man would be at the pumps, another under a car, and the third at coffee. (Louisiana is the world's heaviest per capita consumer of coffee.)

Since a telephone answering device has been installed, there has been a 20 per cent increase in business.

Communication involves at least two persons. The desire to communicate can never materialize into anything unless means are provided for receiving the message. It is not possible to have someone posted near a telephone at all times. But means are now available so that a telephone won't continue to ring and ring aimlessly. And, then, too, there is something negative and frustrating in being unable to establish telephone contact.

The telephone answering devices represent another great advance in the technical art of communication. These devices are an integral part of modern automation, and modern automation is essential to our continued well-being in terms of material comforts and necessities.

More goods and services must be produced faster and faster with less human physical effort, because an increasing population is demanding more and more.

The part that telephone communication plays in this dynamic economic drama has already been explained in many previous articles in TELEPHONY.

Telephone communication means that a call is placed and that call is received. Since the percentage of completed calls is rising, due to answering devices, there are corresponding contributions to:

(1) The overall wealth and income.
(2) Continued economic stability.

The so-called "service industries" offer the greatest potential for telephone companies in marketing answering devices. Although the subject has been discussed in TELEPHONY (Oct. 31, 1959), in an article "The Telephone in the Development of the Service Industries," this subject will be presented in more detail in the near future. The purpose of the fuller discussions of the service industries is to present an analysis that should be helpful to telephone companies in marketing automatic answering instruments.

The latent and dormant possibilities for answering devices are very considerable. The efforts to promote the fuller use of the instruments should prove very rewarding if the sales efforts are directed into the most productive channels.

Several articles designed to provide assistance in this over-all aim are now being prepared for publication at an early future date.

T.O.P. TOPICS

Continued from page 38

party. In all probability the report should have read "u 1 hr fc pasture" which, translated, means "(cld pty) is expected back at called telephone in an hour. He is out in the pasture now." Sounds more logical, and is certainly easier to enter and decode. And we *do* check tickets frequently, canceled, too, in order to determine why the calls were not completed—on the first attempt.

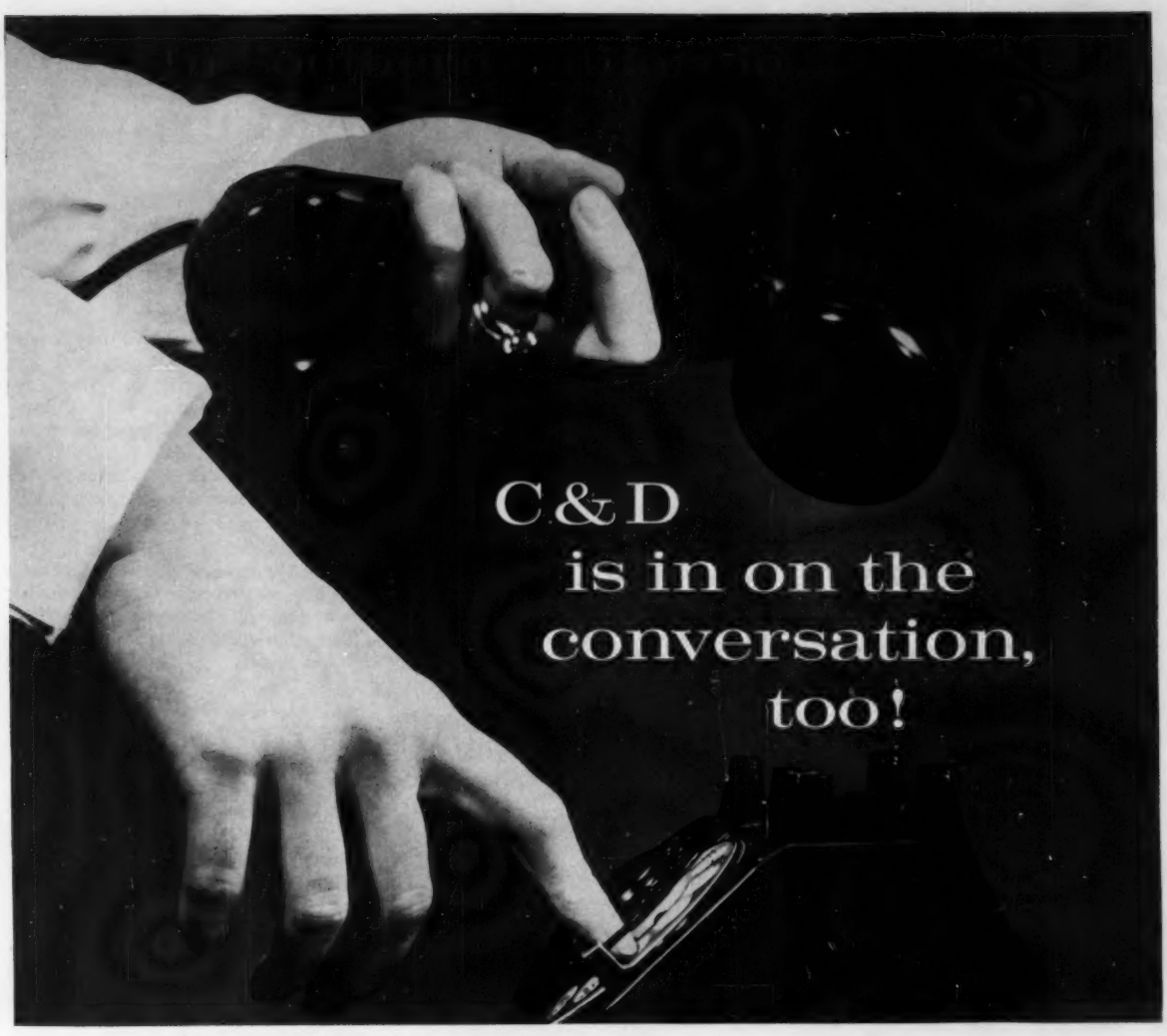
Other frequently necessary codes are:

(1) ag—try again.
(2) ay—anyone.
(3) by—busy.
(4) cf—cannot find.
(5) cld pty—called party.
(6) clg pty—calling party.
(7) cto—cut-off.
(8) da—doesn't answer.
(9) fc—find called party.
(10) lf—left telephone, or left receiver off hook.
(11) lk—looking for.
(12) lw—leave word.
(13) lw 70—left word for called party to report to Operator 70.
(14) ms—mobile service, also used for certain mark sense indications.
(15) nc—no circuit available.
(16) nc ht—no circuit available due to heavy traffic.
(17) nf—telephone listing not found.
(18) pd—paid.
(19) pl—place.
(20) pn—person notified, also used to classify a person call at reduced rates.
(21) ud—indefinite report, not known whether called party will be there.
(22) un—party unknown.
(23) u tm—expected tomorrow.
(24) ver—verify or verified.
(25) wt—will talk.

There are many other codes which may and should be used, but these cover most of the usual reports. Use them on tickets but do not use them in giving reports to anyone except other operating employes.

If the necessary, and only the necessary, entries are made on the toll tickets and those entries are legibly written in the proper spaces, then the structure of the toll ticket is correct. How is the anatomy of the toll tickets in your office?

There's always something new under



Advanced PlastiCell and PlastiCal® battery power assures dependable telephone service for California Water & Telephone Co. system

Furnishing dependable communication service for a network of 146,000 telephone stations and 325 PBX installations in the Los Angeles, Riverside, and San Bernardino County areas calls for top quality equipment.

Typical of the many high quality C & D PlastiCell and PlastiCal® batteries located in central offices, exchanges, and subscriber firms is this 420 amp-hr, 23-cell PlastiCell CE-420 battery. The battery is used to power one of the company's larger PABX telephone installations.

C & D pioneered the convenient, shockproof, clear plastic case telephone battery. Both PlastiCell (conventional lead-antimony grid) and PlastiCal® (advanced lead-calcium grid) batteries feature *triple*-insulated, *full .266" thick* plates for extra capacity and extra life. PlastiCell is designed to give 14-year life in full-float service — PlastiCal, *25 years*. Besides, PlastiCals require watering only about once a year!

For battery details, send for new C & D Bulletins T-532 and T-533. Your C & D representative or telephone equipment supplier will be glad to discuss your specific battery requirements.

C&D C & D BATTERIES
of Conshohocken, Pa. ... Attica, Ind.
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Manufacturers of Dyna-Cel® Industrial Batteries • PLASTICELL and PLASTICAL® Batteries for Communications, Control and Auxiliary Power • Producers of Autolite* Silicon Chargers
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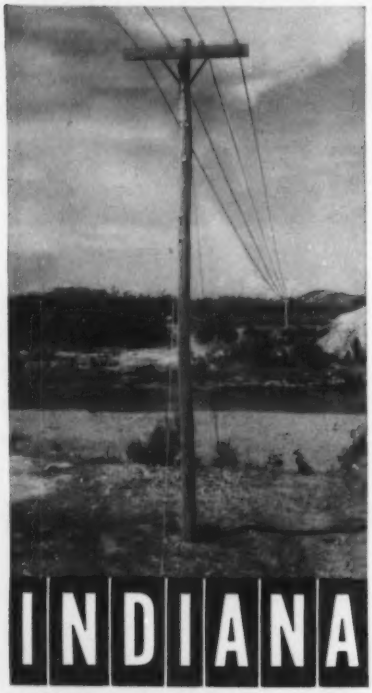
Crapo
HTL-195
EXTRA HIGH-TENSILE TELEPHONE LINE WIRE
for low-cost Rural Lines

• Spans up to 600 feet in Heavy Loading, 650 feet in Medium Loading and 700 feet in Light Loading districts are possible where Crapo HTL-195 is employed. This extra long span construction results in marked savings in costs per mile of line. Pole structures can be reduced to a minimum. Fewer pole structures mean substantial savings both in materials and man-hours of labor. There is less hauling to be done, fewer holes to dig, less material to be handled, installed and connected.

Improved electrical qualities make practical typical subscriber loops of 14 to 15 miles with normal voltages and equipment. Also can be used for subscriber carrier.

Write for Engineering Manual No.TM-59



INDIANA
STEEL & WIRE CO., INC.
MUNCIE, INDIANA

the sun, contrary to the old platitudes. In the next article we will delve into the new methods of handling calls from public telephones. The changes are many and drastic—but all to the good.

So, it's full steam ahead for better, speedier service.

(To Be Continued)

WHEATSTONE BRIDGE MEASUREMENTS

Continued from page 52

TL = Total length of the line in miles.
IR = Insulation resistance per mile.

In this case, it is equal to TL × IR, or 10 × 1 = 10 megohms per mile. In making the measurements, it is assumed that the series resistance of the line conductors is negligible compared with the insulation resistance.

Some of the factors that govern the quality of a telephone line insulation resistance are defective insulators, wet or damp insulator pins, crossarms and poles, bad tree conditions, vines growing on poles, etc. These all tend to cause leaks through the conductor insulation resistance, and they vary with each particular pole line, depending upon the extent of the breakdown of the insulating material.

In some cases, when making a Varley or Murray measurement, a marked difference in earth currents will exist between the local ground connected to the bridge "GR" binding post and the ground fault being measured. Because of the bridge being grounded while performing the Varley or the Murray test, if these earth currents should fluctuate widely or change in direction, they may, by reducing or increasing the value of the normal current flowing from the bridge battery, cause the resultant bridge balancing current to be so variable that the galvanometer needle cannot be balanced at zero.

However, greatly improved results may be obtained in such cases by increasing the voltage of the bridge battery. The earth potential will then be smaller in proportion to the battery voltage, thus making it possible to balance the bridge.

(To Be Continued)

VIRGINIA CONVENTION

Continued from page 60

"produce stronger, larger and perhaps more aggressive companies."

He also pointed out: "We still have with us the twin spectres of creeping socialism and spiraling inflation. This problem . . . will call for our greatest effort to combat it in the future."

Increased cooperation in joint use of facilities was favored by Mr. Will. He also advocated elimination of the 10 per cent excise tax on telephone service, and said he thought Independent telephone companies in rural areas have a significant stake in this and that perhaps they have more political leverage in this matter.

He concluded: "With vigilance and competence as our objectives, we can look forward to a period of great growth."

"Cost of Construction" was discussed by H. D. Long, of the Chesapeake & Potomac Telephone Co. He gave these three reasons why cost of construction is important:

(1) It affects the rate base.

(2) It's a key factor in financial planning—if records don't reflect total cost then projections are liable to be incomplete.

(3) Both Federal Communications Commission and the state corporation commission charge companies with keeping total cost records, not permissively but directively.

Mr. Long then reviewed many of the essential elements of construction cost, offering on each comments intended to encourage those responsible for entering these costs to take as penetrating a look at them as possible. Elements of construction cost along with some of his comments are:

(1) Labor cost—an element that is climbing. What are the hidden costs?

(2) Supervision. How far up the line are supervisory costs chargeable to construction and maintenance. Wherever some part of the higher echelon of management is involved then an equitable portion is chargeable.

(3) Transportation. If a foreman is making the rounds from job to job, then his vehicle cost is chargeable to the construction account.

(4) Machinery and tools. Some portion of cost of these is includable in construction costs.

(5) Engineering expense. If traffic engineering personnel spend time on construction, then their time is chargeable.

(6) Materials and supplies. How about cost of handling, receiving and storing (supply expense)? Proper parts of all of these are attributable to the construction account.

(7) Privileges and permits. Costs of permits to set poles in city streets, or tear up city streets, or to go across a piece of property.

(8) Architect's fees.

(9) Inspector's costs.

(10) Construction services—electricity, telephone, office expense.

(11) Interest during construction—

a reasonable rate of interest that reflects cost of construction funds.

(12) Insurance. If a company has workmen's compensation insurance, it is permitted to include an equitable portion in construction costs. The same for fire and public liability insurance.

(13) Injuries and damages—if directly attributable to construction activity (involving either employes or the public), then they're includable in capital accounts.

(14) Cost of watchmen.

(15) Barriers and other enclosures.

(16) Taxes—under certain conditions; for instance: real estate tax on land which is tied up in construction, then a proper proportion of the tax is includable.

The important thing to bear in mind, Mr. Long stated, is that if construction and maintenance costs are understated, a company will have to live with them for a number of years.

Arnold Swallows of Durham, N. C., stressed "The Importance of Adequate Transmission," the fifth point in his formula for good telephone service and the one for which subscribers pay. The formula:

(1) The right features—type, color, shape, and operating features that customers want.

(2) When they are needed—not only applies to giving a customer a telephone when he wants it, but to give dial tone when he lifts the receiver, no all-trunks-busy tone, but rather a prompt connection.

(3) Where they are needed—located for easy access and convenience.

(4) As long as he needs them—service without interruption; freedom from line or equipment failure.

(5) With satisfactory quality—this is transmission.

Mr. Swallows stated that carrier is now proving in, in some cases, over open wire or cable for distances as short as 10 to 15 miles. He said some of the reasons why carrier is so popular today are:

(1) Carrier is more flexible than physical outside plant as to application and relocation.

(2) A good carrier circuit costs little more than a poor or mediocre one, and during inflationary periods the proportionate cost of carrier does not rise as rapidly as the cost of physical circuits.

(3) For long distance transmission of data, facsimile or slowed-down video, carrier is more adaptable than physical circuits. Note: Slowed-down video means transmission and display of relatively simple (usually stationary) pictures.

He added, "In addition to cable and open wire carrier, we now have radio and microwave which are capable of transmitting several hundred voice channels simultaneously over one wideband carrier channel. This is basically

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CEECO TERMINALS FOR DIRECT BURIED PLASTIC WIRE AND CABLE

• Loading one or more pairs as required using Type C152 ready mount assemblies

LUG—3 TERMINAL WITH ONE PAIR TERMINAL ASSEMBLY AND ONE C152-1 LOADING COIL

TYPE CH-3 STEEL "BELL JAR" COVER 8" HIGH

★ **PEDESTALS** — TWO PIECE SIX FEET LONG

★ **POLE BRACKETS**—AVAILABLE FOR AERIAL MOUNTING

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★ **NON-PROTECTED TERMINALS** — CP16 ASSEMBLIES AVAILABLE IN ONE, TWO, SIX, TWELVE AND SIXTEEN PAIR COMBINATIONS

★ **ACCESSIBLE** — FOR TESTING, CABLE OR WIRE SPLICING, CROSS CONNECTING AND SUBSCRIBER DISTRIBUTION

★ **ECONOMICAL** — BUY ONLY WHAT YOU NEED—ADD LATER

★ **STRONG** — ALL GALVANIZED STEEL CONSTRUCTION

CATALOGUE NUMBER	DESCRIPTION	CAPACITY	WIRE & CABLE
LUG-3	TERMINAL PEDESTAL ASSEMBLY AND 8" HOOD NO TERMINAL STRIPS, NO COILS	TERMINALS	LOADING
		ONE, TWO AND SIX PAIR	ONE TO THREE PAIR

EXPANDABLE TO MEET YOUR LARGER REQUIREMENTS WITH STOCK HOODS OF 15, 21½ AND 32½ INCHES HIGH

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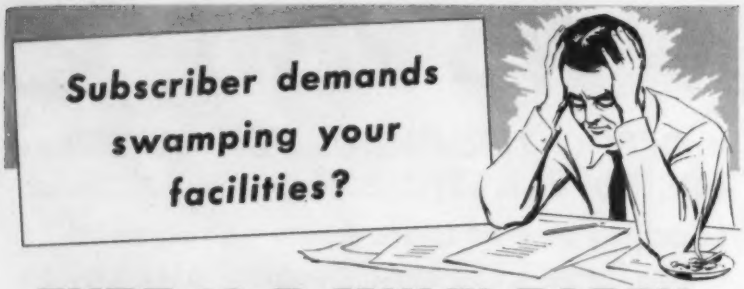

TYPE 16-B MULTI-PARTY 7-CHANNEL CARRIER is your low-cost answer!

Budelman Type 16-B Carrier will:

- Provide additional circuits on existing party lines.
- Provide more-party service on new party lines.
- Better the service on existing party lines.
- Provide new circuits to new areas or subscribers beyond the 1200 ohm loop range.
- Free party line circuits for private line or pay station service.
- Provide additional trunks to remote PBX, PABX, or key telephone systems.

FULLY SELECTIVE 10-PARTY DIVIDED RINGING
SEMI-SELECTIVE 10-PARTY BRIDGED RINGING
SINGLE FREQUENCY CODED RINGING

All this without adding to your outside plant or disturbing existing services.

Fewer Vacuum Tubes, Simpler Circuitry than any other carrier system on the market

CENTRAL OFFICE TERMINAL

Crystal-Controlled Oscillators, Automatic Regulation — found only in systems costing much more.

SUBSCRIBER TERMINAL

7 Channels — 10 to 140-kc frequency range. Applicable wherever attenuation at carrier frequencies does not exceed 35-db.

Write or Call Us for Bulletin 259-D

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the same as wire carrier with the exception of the transmission medium. The transmission medium for radio and microwave (being) 'free space.'"

In his further consideration of transmission quality control, Mr. Swallows said there must be an objective or a gauge by which performance is measured. The first step in establishing a design objective for telephone service is to determine the quality of transmission the customer really wants. He said the basis for setting the objective should be performance rather than tolerance or complaints; and, he pointed out, the latter basis is negative in attitude and is not in keeping with the purpose of the telephone business. Mr. Swallows continued:

"An objective based on performance will produce a service that is desirable and economically sound. By no means should our goal be based on what the public will tolerate but rather what the public will want and consider a bargain.

"Our present objective in transmission quality is based on past performance and future goals. In short, we have inherited a certain amount of telephone plant which must be utilized until it can be economically replaced.

"Meanwhile recent developments in subscriber instruments allow us to improve the quality of transmission without a wholesale change-out of outside plant.

"In setting the design objectives for transmission performances, efforts are usually concentrated on types of plant in which the most improvement can be made for the least amount of money. For example, toll circuits are more efficiently utilized than local loops; therefore, an improvement in a toll group will benefit the whole exchange whereas an equal effort aimed at local loop improvement would benefit only a small portion of that exchange."

"The Effect of DDD on Traffic Operations," was the subject of a talk by A. C. Zeller of Columbus, O. Some of the principal effects of DDD, he said, are on:

(1) The distribution of traffic between short and long-haul and station-to-station and person-to-person.

(2) The volume of collect, coin box, enterprise, PBX and PABX traffic.

(3) The availability of the trunk layout.

He added that because these factors vary for each office and area, their effect can only be determined by a detailed study.

Mr. Zeller set forth a fairly extensive discussion of the effects of DDD on traffic operation, which he concluded by mention of the following:

A new telephone numbering arrangement known as "Selected Letter" numbering was introduced in eight subur-

ban Buffalo, N. Y., communities on Oct. 4, 1959, when these tributaries were converted to 2L-5N numbering. Selected letter numbering uses a two-letter central office designation in place of a central office name.

Some examples of this type of central office designation are as follows:

Alden	XF 7
Clarence	RL 9
Eden	XX 2
North Collins	FF 7

Only eight of the 24 letters on the dial are used in Selected Letter numbering—one for each dial pull.

The letters selected to prevent misunderstanding in pronunciation are as follows:

Dial Pull	2 3 4 5 6 7 8 9
Letter	A F H L N R T X

Mr. Zeller also reported that studies have recently been made to determine the advantages in speed of dialing and memory ability between the present method of 2L+5N numbering and all digit numbering. From these tests it appears that customer numbers consisting of seven digits can be dialed in slightly less time than the present 2L+5N numbers.

Furthermore, he said, these tests also indicated that all-digit numbers can be memorized in the same degree as the present 2L+5N numbers.

As the all-digit numbering system or the selected letter numbering system would make many more codes available for central office designation, we can expect to hear more about them in the future, Mr. Zeller predicted. In fact, he said he had been told that several companies are adopting the all-digit numbering system.

Mr. Zeller went on to say, "It is planned to establish centralized information bureaus for customer-dialed traffic in each numbering plan area. Under this plan a customer wishing to secure a number in a distant city would dial the area code plus 555-1212. This number will be common in all areas. "The dialing of the area code and this number will connect the customer with the information center in that area. This operator will provide the customer with the required information, either from records available to her, or from an operator at the point requested."

Warren B. French Jr., Edinburg, told of his company's recently being authorized by the commission to offer flat rate four-party rural service. This offering was reported in full in TELEPHONY, Nov. 28, page 38.

"Progress in Materials and Engineering" was covered by Ray Ballard, REA outside plant engineer. He reviewed new materials and new methods being introduced in the industry.

W. B. Brennan, of the C&P company, described "Mark Sensing of Toll Tickets," using visual aids. He went over company plans for converting to this system.

Re-elected directors were: C. Lacey Compton of Manassas, Va.; Charles P. Lamm of Charlottesville, Va.; W. N. Scholl of Bluefield, W. Va.; and P. T. Campbell of Hanover, Va.

J. Kempter West of Farmville, Va., was newly elected a director.

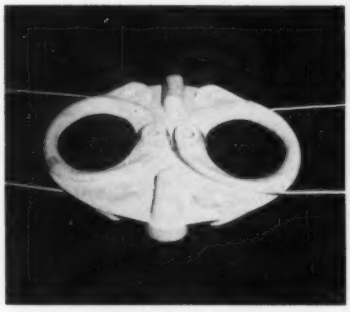
Other directors are: C. J. Logan of Tarboro, N. C.; Stanley A. Owens of Manassas, Va.; Virl L. Choate of Martinsville, Va.; E. C. Garnett Jr., of Lexington, Va., and L. John Denney of Amherst, Va.

Also, A. G. Stogdale of Staunton, Va.; Warren B. French Jr. of Edinburg, Va.; A. E. Reynolds of Bristol, Tenn.; W. Tayloe Murphy of Warsaw, Va., and Harry P. Cavendish of Harrisonburg, Va.

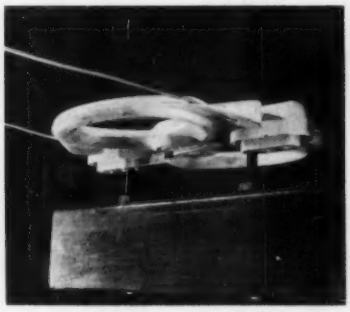
The directors elected the following officers: President, Mr. Compton; first vice president, Mr. Choate; second vice president, Mr. Stogdale, and secretary-treasurer, Mr. Lamm.

INTRODUCING The "TOPO" Line

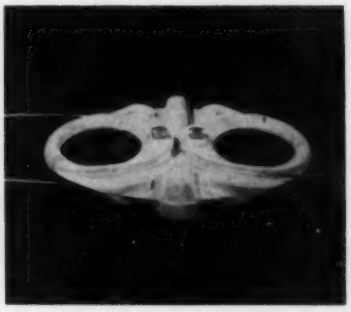
Transposing plate that transposes the open wire circuit left over right or right over left



IN THE SPAN



ON THE CROSSARM



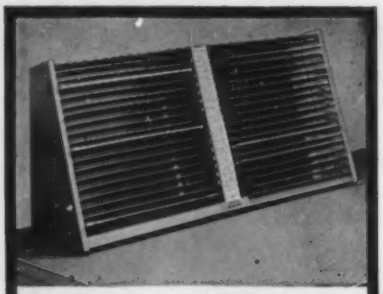
OR ON THE POLE TOP

• Thirteen inches in diameter. • Weighs less than four pounds. • Shatterproof, impregnable to light rifle fire. • Grooved for 8" and 12" wire spacing to accommodate conductor sizes to .165. • Double skirted around 1/2" or 5/8" self tapping bolt holes that provide 8"-10" or 12" pin spacing. • The 8" spacing permits pulling into mid-span. • May be lagged to top of pole on single circuit insulated wire.

Molded of FIBREGLASS REINFORCED POLYESTER, excellent insulating properties, very high impact strength. After extensive field tests, the "TOPO" plate was selected as the mechanic to transpose a multi-channel circuit of 463 miles in length.

Our introductory offer, Price 3.95 each and freight prepaid on 25 or more.

THE TRANS TECHNION CORPORATION • 2816 Aldrich Avenue South • Minneapolis 8, Minn.



Trouble Recorder Card Rack

For fast orderly sorting of Trouble-Recorder cards, has 38 card slots in two banks with index strip between. Base is 38" by 8". Height 15". No. D30225-1.

Telephone Office Equipment

to lighten your work and improve efficiency

Work Bench

For repair, assembly, test and paper work. Top drawer divided into 24 compartments for parts and tools. Large file drawers are for circuit drawings. 54" x 25" top covered with masonite. Height 36". Drawers may be inserted from back to reverse position of kneehole. No. D29978-3.

Drawing Table

For circuit drawing in crossbar offices, provides central location for reference material. Masonite top is 30" x 60". Height 36" at front, 42" at rear. Three large file drawers at left for drawings. Eleven shelves at right are 2½" high, 14" wide, 18" deep for sketches, sequence charts, book type SD sheets, trunk serials, etc. No. D30326-1.

Color of all units: Baked-on gray enamel unless otherwise specified.

TWIN POST

Neubauer

MANUFACTURING CO.

517 LOWRY AVENUE N.E.

MINNEAPOLIS 18, MINN.

ASEE Announces Latest Recruitment Guide Book

The American Society for Engineering Education (ASEE) has announced publication of a revision of its leaflet, "Recruiting Practices and Procedures—1959."

This is a guide for recruitment of engineering college graduates, which incorporates a set of ethical standards applicable to students, college placement offices and employers.

Activities bringing together college graduates and would-be employers must meet four conditions—ASEE says:

(1) To promote a wise and responsible choice of career.

(2) To strengthen students' sense of integrity.

(3) To develop in students an attitude of personal responsibility for their choice of career and for their success in it.

(4) To minimize interference with their education while it is being completed.

"It is in the best interest of students, colleges, and employers alike that the selection of careers be made in an objective atmosphere and complete understanding of all of the facts," states The ASEE guide.

The eight-page leaflet lists in detail recommended practices and procedures by employers, colleges, and students to assure that these ends will be achieved.

"It is the hope of ASEE," according to Professor W. Leighton Collins of the University of Illinois, secretary of the society, "that this leaflet gets into the hands of every engineering senior seeking employment, as well as recruiter, and college placement officers.

"It is designed as an aid in the development and maintenance of high ethical standards in the procedures of college recruiting and in the relations between the employing organization, college authorities, and college students."

This is the second revision of the original "code," first published in 1949.

W. W. Burton, employment manager of the Minnesota Mining & Manufacturing Co., and chairman of the ASEE Committee on Ethics which was responsible for the publication, says, "This is a combination of the best thinking of representatives from both industry and education and represents the highest standards of ethical procedures yet developed. In its prepara-

Convention Calendar

1960

Association	*Date*	*City*	*Hotel*
Minnesota	Feb. 7, 8, 9 and 10	St. Paul	St. Paul
Mississippi	Feb. 15 and 16	Unannounced	Unannounced
Louisiana	Feb. 24 and 25	New Orleans	Jung
Kentucky	Mar. 1	Lexington	Phoenix
Texas	Mar. 7 and 8	Dallas	Baker
Ohio	Mar. 28, 29, and 30.	Columbus	Deshler Hilton
Iowa	Apr. 5 and 6	Des Moines	Ft. Des Moines
Nebraska	Apr. 19 and 20	Omaha	Sheraton-Fontenelle
Indiana	May 4 and 5	Indianapolis	Claypool
Wisconsin	May 10 and 11	Milwaukee	Plankinton House
Illinois	May 19 and 20	Springfield	Abraham Lincoln
Kansas-Missouri*	May 23 and 24	Kansas City	Town House
Pennsylvania	June 6 and 7	Bedford Springs	Bedford Springs
California	June 8, 9 and 10	San Francisco	Fairmont
Washington-Oregon*	June 16 and 17	Portland	Sheraton Portland
New York	June 20, 21 and 22	Schroon Lake	Scaroon Manor
Michigan	Sept. 12 and 13	Mackinac Island	Grand
Rocky Mountain	Sept. 14, 15 and 16	Denver	Hilton
USITA	Oct. 9, 10, 11 & 12	Chicago	Conrad Hilton
Oklahoma	Nov. 9 & 10	Oklahoma City	Skirvin

*Joint Convention

If you want maximum service
Specify T-C Pressure-Treated Poles

. . . Then rest assured *you* have poles with the best in preservation. Here's why . . . each step in our production is subject to precise and accurate control, timber selection, manufacture, moisture removal and treatment. And, only the finest chemical preservatives are used. You get uniform high quality, the best in preservation and maximum service with the T-C brand on your poles.

Specify T-C

DISTRIBUTED BY AUTOMATIC ELECTRIC SALES CORP. AND LEICH SALES CORP.

TAYLOR-COLQUITT TIMBER CONSERVATION T-C

TAYLOR - COLQUITT CO.

SPARTANBURG, SOUTH CAROLINA

PLANTS AT SPARTANBURG, SOUTH CAROLINA AND WILMINGTON, NORTH CAROLINA

Presenting now the

New and Improved Murphy Silent Buzzer

Models SBT-2 and SBR-2 (all sets shipped after June 1, 1959)

FOR 2-MAN TESTING TO IDENTIFY CABLE PAIRS IN NEW OR WORKING CABLES—WITHOUT INTERFERENCE—EVEN ON BUSY LINES

SBT-2

- **Eliminates monitoring for busy lines**
- **Never disturbs any line**
- **Super-heterodyne circuit, battery powered**

SBR-2

- **Faster testing to identify pairs**
- **Loud clear two-tone signal to splicer and helper**
- **Compact and light, 3x4x5 inches**

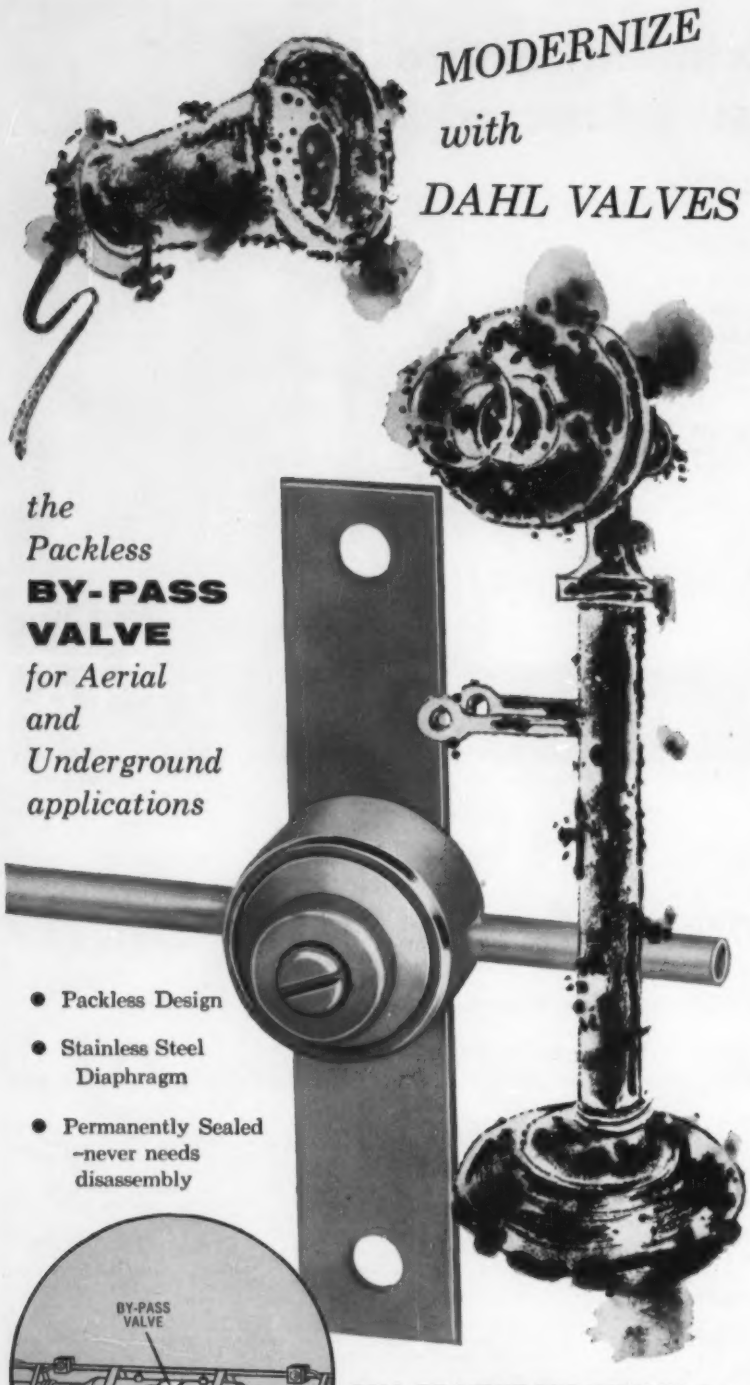
1. Increased power for the Transmitter for the longest loaded cables—without interference
2. Increased Receiver sensitivity—now 7 transistors—for efficient pick-up with the capacity probe
3. Smoother and less critical volume control, no overloading of early stages on shorter cable runs
4. Spare probe tip holder moved to the top of each case instead of attaching to the cord plugs
5. Improved capacity probe, 10 times greater pick-up, can be "hooked" onto proper pair with one hand and pair moved and held away from other pairs for positive identification
6. Two slide switches have been replaced by a single rotary switch, for simpler and more dependable operation
7. Instructions included for a simple connection on the Receiver to convert it to a source of low frequency tone—so that the splicer can pick out a spare pair for a talking pair and the helper can locate it in the central office with a monitoring set
8. A convenient and durable carrying case is now available for carrying the silent buzzer, all cords, batteries, the Field Test Board and the Speed Tester for maximum protection during storage and transportation
9. In use on a busy line, neither the splicer nor helper can hear any part of the subscriber's conversation
10. Transmitter uses only 5 ma from a 4½ V battery. Receiver uses only 6 ma from a 4½ V battery, or a total for both of only 49.5 milliwatts—from low cost batteries.

Net price $194.00 per pair—f.o.b. Houston, Texas.
Shipping schedule—90 days. Write for additional information on this and other telephone test equipment manufactured by

ELECTRONIC RESEARCH DEVELOPMENT MANUFACTURE

MURPHY ENGINEERING LABORATORIES, Inc.

4419 Tulsa — Houston 24, Texas



tion, industry and education have had equal voices."

It is noted, the ethics committee of the Engineers' Council for Professional Development, the organization responsible for accrediting engineering curricula, again has endorsed the "code." Indeed, according to P. L. Alger, chairman of the ethics committee, the ASEE recruiting "code" now constitutes a supplement to the ECPD canons of ethics.

Secretary Collins of ASEE hopes that other organizations and publications, and particularly the technical publications which reach engineers and engineering students, will print the "code" verbatim in their magazines, including the foreword; the only requirement is that the source of the "code" be acknowledged.

Copies of "Recruiting Practices and Procedures—1959" may be purchased from ASEE at the University of Illinois, Urbana, Ill., for 10 cents each, 25 for $1.00, or $3.00 per 100.

OPERATOR'S CORNER

Continued from page 64

called party is expected today, or it is not known whether he will be there today, what should the operator say to the calling party?

(4) If the called party is expected today, or it is not known whether he will be there today, and the calling party wishes the operator to leave word, should she do so?

(5) If an extension or room or apartment telephone is busy, should the operator hold the calling line while she makes a second and, if necessary, a third attempt at approximately five minute intervals?

Answers to questions are on page 98.

MINIATURE THERMAL MAGNETIC CIRCUIT BREAKER

With Alarm Circuits
SERIES 44-000.00

CURRENT: 50 milliamp (min) to 10 amp (max)
VOLTAGE: 250 V A.C. 60 V D.C.
CASE SIZE: 1.653 x 1.614 x 0.433 inches

Ideal as a dependable sensitive protection in communication equipment, telephone systems, electronic and electrical equipment. Available with auxiliary circuits to signal "Make" and "Break" position; features manual release for occasional disconnection of equipment from line.

Why not replace bothersome fuses with modern E-T-A circuit breakers!!!

E-T-A

Call or write

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NOW

. . . A NEW wing ding® WALL ANCHOR

SPECIAL SIZE
for TELEPHONE INSTALLATIONS
in THICK WALLS . . . for ¼" HOLE

New, No. 4 LL . . . for walls ⅜" to 1¼" thick, Drill ¼" hole permits use of lighter anchor for THICKER WALLS

OTHER SIZES:

For Hollow Walls:
Use #4SL 1/16" to 3/4" thick (1/4" hole)
Use #5SL 1/4" to 1-1/4" thick (5/16" hole)

For Hollow Doors:
Use #4SS 1/16" to 3/8" thick (1/4" hole)

Ask your distributor
Write for prices

DIAMOND EXPANSION BOLT CO., Inc.
500 NORTH AVENUE GARWOOD, N. J.

TBM SERVICE ENTRANCE MAST for OUTDOOR TELEPHONE BOOTHS

Patent Pending

Model TBM Mast provides complete service entrance facilities for outdoor telephone booths with the definite plus advantages of lower cost and easier installation. Raises power lines for specified ground clearance.

FITS MOST BOOTHS
Meets Code Requirements

LOOKS BETTER The TBM Mast is engineered for the job. Adds to the appearance of any booth.

LASTS LONGER Heavy gauge steel tubing used throughout for life-time service. Only heavy duty fittings used.

COSTS LESS Actual installations show savings up to two-thirds over conventional installations.

Utility Service Co., Inc.

1620 THIRTEENTH STREET **RACINE, WISCONSIN**

SMALL—COMPACT—RUGGED
EASY MANEUVERABILITY

TRENCHING IS MORE PROFITABLE WITH THE BUS BROWN TRENCHER

MODEL 346 OFFERS

- More Economy
- Maximum Efficiency at Minimum Cost
- One Man Operation Eliminates High Labor Costs
- More Speed
- Digging Speed and Maneuverability Leads to Faster Job Completion
- Simplicity—Compact and Simple Design Eliminates High and Extensive Maintenance Costs
- Designed For Many Digging Jobs —
  - Water Lines
  - Gas Lines
  - Underground Electrical Wire
  - Lawn Irrigation
  - Underground Telephone Cable
  - Signal Cable
  - Laying Out Limits For Excavations

SPECIFICATIONS

1. Power — Model AENL Wisconsin engine.
2. Shipping Weight — 750 lbs.
3. Frame — Rigidly Welded ¼" steel plate.
4. Tires — 4x8 Pneumatic, traction type.
5. Digging Chain — Tough Roller Chain with easily detachable Cutters.
6. Bearings — Roller Bearings with zerk fittings. Ball Bearings, permanently sealed.
7. Trenching Width and Depth —
   3 inches wide up to 5½ feet deep.
   4 inches wide up to 3½ feet deep.
   6 inches wide up to 2½ feet deep.
   (Obtained by different length booms and boom control).
8. Self-Propelled — Drives on all four wheels while digging, rear wheels while in transport gear.
9. Hydraulically Controlled Digging Boom.

Manufactured by

BROWN MANUFACTURING CO., Inc.
WOODBINE, IOWA

GENERAL MACHINE PRODUCTS COMPANY, INC.
Old Lincoln Highway at Pa. Turnpike, Trevose, Pa.

C-R POWER REEL

SLACK PULLER

CABLE FEEDER

GMPCO

AERIAL TENTS
CABLE BENDERS
CABLE BLOCKS
CABLE LASHERS
COAXIAL CABLE TOOLS
LASHING WIRE
CLAMPS AND GRIPS
PORTABLE & POWER REELS

Distributed by GraybaR ELECTRIC COMPANY

PRESSURE TESTING KIT

COMPOUND

B, C, D, E, & G CABLE LASHERS

Special Purpose Tools To Specifications — Catalog on Request

Over 600 various items of Line Construction Tools, Maintenance & Pressure-Testing Equipment in stock for immediate shipment

Italian Telephone Progress Since War Chronicled

A look at Italy's postwar telephone development was provided recently by the magazine, *Trade with Italy*.

As of June 30, 1959, the publication reports, the number of subscribers has reached 2,627,000 (as compared to 620,000 by the end of 1946) and the number of telephones in use, at the 1959 date, was 3,330,000. At the end of 1958, the number of telephones per 100 inhabitants reached 40 in Milan, 28 in Turin, 27 in Rome, and 24 in Florence. These figures are significant when compared to an average of 37 in London, 32 in Paris, and 28 in Brussels.

Long distance and international service is rendered by Azienda di Stato per i Servizi Telefonici.

Five telephone companies which have a governmental franchise serve local areas and provide inter-urban communications within their franchise areas.

These companies are: STIPEL, operating in Piedmont and Lombardy; TELVE, operating in the three Venetian regions; TIMO, operating in Emilia, Marche, Umbria and Abbruzzie Molise; TETI, operating in Liguria, Latium, Tuscany and Sardinia; SET, operating in Campania, Apulia, Basilicata, Calabria and Sicily.

Up to about a year ago, the journal states, three of the operating companies were indirectly controlled by the state, while the other two were in the hands of private interests. During the past year, the stock of all the privately-owned companies was acquired by a holding company called "STET," Societá Finanziaria Telefonica."

Of the stock of STET, 58 per cent is held by a state-owned agency, the remaining 42 per cent being spread mostly among 60,000 private shareholders.

At the end of the war in 1945, the first step was to re-establish essential

Answers to Questions On Page 64

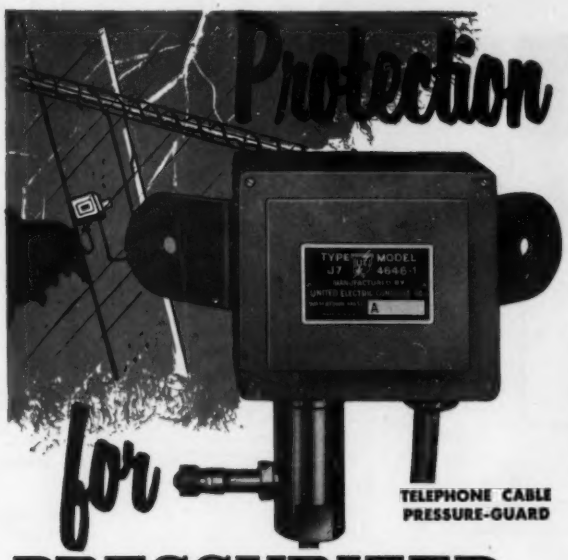
(1) The operator should proceed with the call herself in accordance with the indicated action.

(2) Yes, she should request him to do so.

(3) The operator should say, for example, "Would you prefer to place your call again, or shall I leave word for Mr. (called party) to call you?"

(4) Yes.

(5) Yes, the line should be held.



PRESSURIZED CABLE SYSTEMS

The need for an automatic device to stand guard at intervals along pressurized cables has long been recognized. Now United Electric Controls has the answer . . . The Telephone Cable PRESSURE-GUARD.

Developed by U.E., in collaboration with the Bell System, the PRESSURE-GUARD is now available to all Telephone Companies as an aid in reducing cable maintenance costs.

In the past the location of a cable leak was a matter of man hours in climbing poles and manually checking pressure points. When the pressure guard detects a pressure drop it introduces an electrical resistance . . . which indicates at a central monitoring source a cable leak and the location.

Specifications Pressure-Guard

Field Adjustment Range	0 to 15 PSI
Factory Setting	2 ±¼ PSI on falling pressure
Pressure Response	4 ±½ oz.
Proof Pressure	30 PSI
Electric Rating	0.01 amp 110V DC
Load Resistor	Carbon composition 330,000 OHM 1 watt
Take-Off Tube	Tinned Copper 6′ x ¼″ x 0.035
Drop Wire	6′ Type SJ0 #18 stranded 0.2 conductor
Size	6″ x 4½″ x 2½″
Approximate Weight	1¾ lbs.

These specifications may be modified in a great variety of ways to meet the requirements of any given application.

UNITED ELECTRIC *manufactures a complete line of temperature, pressure, and vacuum controls. For applications requiring custom-built units or modified standard units, call upon a UE application engineer for recommendations. Write for complete specification and pricing data on the Telephone Cable Pressure-Guard. Similar data available on all other UE controls.*

UE®
United Electric Controls
COMPANY
85 SCHOOL STREET, WATERTOWN, MASS

Support aerial cables with

CF&I Galvanized Steel Strand

The giant steelman reflects CF&I's policy of making only quality steel products for all industries. One of them — CF&I Galvanized Steel Strand — is highly recommended for long-lasting messengers to support aerial telephone cables.

CF&I Strand is flexible and provides positive resistance to corrosion and abrasion.

Made in accordance with ASTM Specification A-122, CF&I Galvanized Steel Strand for guy or messenger wires can also be supplied to individual specifications in seven- or three-wire constructions. For Overhead Ground-Wire, CF&I supplies strand made to ASTM Specification A-363. For quick delivery call the nearby CF&I sales office or see your local electrical distributor.

7088

GALVANIZED STEEL STRAND
THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N.M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita

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New Facts about the Openings and Potential at—

ADVANCED COMMUNICATIONS ENGINEERING

TELEPHONE ENGINEERS: Immediate openings as field engineering supervisor for telephone outside plant and inside plant engineers. 10 years of broad industry background. With some direct field experience desirable.

To arrange for a Confidential interview, please send resume to:

MR. H. J. RECKAS, *Personnel Manager*

ADVANCED COMMUNICATIONS ENGINEERING

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Spiraflex® CORD

BY GENERAL INSULATED WIRE WORKS, INC.*

*Licensed to manufacture under existing patents.

Telephone cord sets of proved performance backed by General Insulated's unmatched experience and know-how in the manufacture of quality telephone tinsel cordage:

Spiraflex **HANDSET CORDS** in bright colors with non-staining thermoplastic jackets in solid color extrusions matching color shade and sheen of telephone sets. Also non-staining black Neoprene jacketed cords. Both types available with or without integral moldings and terminations. Furnished in standard or extra long lengths.

STRAIGHT HANDSET AND DESK SET CORDS are available in non-staining thermoplastic constructions in matching colors and in black Neoprene.

GENERAL INSULATED WIRE WORKS, INC.

A DIVISION OF GENERAL CABLE CORPORATION
Providence 5, Rhode Island

service as soon as possible. To do this, a number of manual exchanges were installed to replace the dial ones which had been destroyed or seriously damaged.

Pre-war level of service and efficiency was reached during 1948 when the number of subscribers and the volume of traffic reached the previous maximum level.

The second aim was to improve and enlarge facilities. During the past five years more than 400 million dollars were invested in new equipment.

However, rates were not commensurate with the actual cost of service, and a rate raise, to pay for further improvement, was needed. In August, 1959, rates were increased by an average of 25 per cent.

The budget for the five-year period 1959-1963 provides for new investment of more than one-half billion dollars. It is based on an estimated increase of subscribers from 2.5 million to 3.6 million over a period of five years. During the same period, toll and long distance conversations will increase, it is estimated, by more than 60 per cent.

The franchises for the five operating companies were renewed during 1957 for a period of 30 years. At that time, the companies agreed to expand facilities in accordance with a 10-year plan, which provides for improvement of service in step with the growth of the Italian economy.

Greek Communications Grow, On Mainland, Islands

Reported in *Foreign Trade* (Ottawa, Can.) recently is the expansion accomplished by the Greek Telecommunications Organization (OTE), which is building nine new telephone exchanges in Greece, this year. Four of these are in the capital area, with 2,400 connections.

By the end of 1959, it is expected that telephone installations throughout the country should total nearly 170,000. This, it is reported, will raise the Grecian average of two telephones per 100 persons to 2.3.

Expansion of the communication system is also planned for the Greek islands. Short-wave, ship-to-shore installations in Attica, Crete, Chios, Patras and Salonika are included in plans. Additional communications connections, comprising cable, telephone and radio, between Athens and Europe and Asian countries, will be extended.

Respect Is Basic

"The first essential to success in the art you practice is respect for the art itself."—BULWER-LYTTON.

Perkins Heads Advanced Development for Stromberg

The appointment of Arthur F. Perkins as head of the newly-established Advanced Development Section in Stromberg-Carlson's Telecommunication Division has been announced by S. B. Weiner, manager of electronic engineering projects in the division. Stromberg-Carlson is a division of General Dynamics Corp.

A. F. PERKINS

The new section will provide a link between the company's research division and product development in the telecommunication division by translating research findings into tested circuits and standard hardware.

Mr. Perkins was born in Ann Arbor, Mich., and attended schools in Detroit. In 1949 he was graduated from the University of Michigan with a degree in electrical engineering.

He spent 5½ years with the General Electric Co., working with semi-conductors and communications products, and participated in drawing up the first military specification on transistors. He also served in the microwave engineering section and participated in the installation of a trancontinental communication system.

In 1946, he and three associates formed the consulting engineering firm of O'Hara Associates, in Syracuse, N. Y.

Work which this company did for Stromberg-Carlson resulted in the development of a compandor. Mr. Perkins holds a patent on this device, and has other patent applications pending.

Discretion

"Judicious absence is a weapon."—CHARLES READE.

ALPHADUCT UNDERGROUND "B" SERVICE WIRE

ELIMINATES UNSIGHTLY OVERHEAD DROPS

PROVIDES EXTRA PAIR FOR SECOND PHONE

...and no other underground service wire can compare with Alphaduct for sheer ruggedness and trouble free service under unfavorable operating conditions. Alphaduct is engineered to withstand moisture, heat, abrasion, deformation and you get these PLUS FEATURES:

HIGH DIELECTRIC STRENGTH

HEAT STABILIZED POLYETHYLENE INSULATION

MINIMIZED CROSSTALK through control of side to side Capacitance Unbalance

ALUMINUM TAPED for electrical shielding against lightning and interference

CONDUCTORS—annealed copper covered steel for strength

AND IT'S DATED—simplifies your record keeping ...proves Alphaduct's durability

When you buy Alphaduct Underground "B" Service Wire, or any one of Alphaduct's different types of telephone wire—you buy the know-how of the recognized leader in the manufacture of insulated wires for the Independent Telephone Industry.

National Distributors
Automatic Electric Sales Corp.
Northlake, Illinois

Leich Sales Corp.
427 W. Randolph St., Chicago, Ill.

WIRE AND CABLE CO.
NEW BRUNSWICK, N. J.
CHarter 9-8090

Regional Distributors
Buckeye Telephone & Supply Co.
Columbus, Ohio

The Lindsay Telephone Supply Co.
Cleveland, Ohio

Pankey Supply Co.
Charlottesville, Va.

Western Representatives Get Training at Preformed

Preformed Line Products Co., in its Cleveland, O. headquarters, recently conducted a "shirtsleeve" training conference for Western representatives. The three organizations represented were:

Shaffer & Nelson, Inc., in Washington, Oregon, Idaho, western Montana, and Utah.

K. M. Ryals Co. in northern California and western Nevada.

Earl S. Condon Co. in southern California, southern Nevada and Arizona.

Working under the supervision of the company's field demonstrators, the representatives learned to make installations of Preformed line accessories for new construction, repair, and maintenance of open line wire, one-pair aerial distribution wire and rural distribution wire. Another purpose of the conference was to coordinate the sales and service activities under Kenneth R. Miller, newly appointed district manager of sales, western area, and Harry J. Billica, communications consultant, both located at the Preformed plant, 600 Hansen Way, Palo Alto, Cal.

Learning to make installations of Preformed Line Products Co. accessories at the company's recent training conference in Cleveland, O., were these representatives from the West.

Particular emphasis was placed on installing the four Preformed products which comprise what the company describes as an entirely new construction concept for open line wire: communications tie for making uniform cradled attachments at the insulator; plastic spacer unit (PSU) for the elimination of mid-span hits; plastic vibration damper (PVD) for arresting vibration; plastic pinch bracket (PPB) for controlled spacing before transposition.

No installation tools were used during the entire conference, Preformed stated.

Similar conferences are anticipated for other Preformed representative groups.

Kellogg Appoints Thornley Manager in Southeast

Charles B. Thornley has been appointed southeastern region manager of Kellogg Switchboard & Supply Co., communications division of International Telephone & Telegraph Corp. He was elevated from sales supervisor of the western region.

Mr. Thornley will headquarter at the company offices and warehouse in Atlanta, Ga., according to the announcement made by O. C. Bailey, Kellogg vice president and general sales manager.

Mr. Thornley is responsible for all commercial activities of the company in Alabama, Florida, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Virginia. The southeastern region is one of six established from coast to coast under Kellogg's decentralized program.

Thornley has been with Kellogg since January, 1958, when he became operating manager of the western region at

Calling All Outdoorsmen

NOW BUY THE BEST FOR LESS

Outdoor Outfitters Company can supply you with all your outdoor clothing at less cost. The same top-quality items you'd find in leading outdoor clothing stores... the only thing different is the price.
You save money because Outdoor Outfitters is a company which only sells and specializes in outerwear for the outdoorsman.

Amazing new Scott Foam makes this underwear more comfortable in the coldest weather, yet lightweight and not too hot for wear in mild weather. Keeps you warm without weight on the job. The shirt has two different snap fastener positions to adjust the length. The pants have elastic waist. Knit collarette and wristlets. Comes in tan. Sizes: S, M, L, XL. (Post paid when remittance sent with order.)

QU-700 Scott Foam Insulated Underwear
ONLY $12.95

Send for illustrated folder of complete line including thermo boots, socks, gloves, insulated vests, sweatshirts, hats, parkas, and pants.

UNCONDITIONAL GUARANTEE. We guarantee every item against any manufacturing defect or fault. If you are not completely satisfied with your purchase, return it and we will gladly refund the purchase price.

Attention: Company Executives (Safety Directors, Personnel Managers, Purchasing Agents) Outdoor Outfitters Company can sell direct to your company for your issue or resale to employees. Send for free catalogue or samples on approval on your letterhead.

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Burlingame, Cal. He was previously employed by the RCA Victor Distributing Corp., working at the Chicago and Davenport, Ia., plants progressively as accountant, operating manager and sales manager.

A native of Scottsburg, Ind., he attended Purdue University and was graduated from Indiana University with a bachelor of science degree. He served in the U. S. Navy and U. S. Air Force during World War II.

Ayers Heads Military Sales For Automatic Electric

John W. Ayers has been named to the new position of director of military equipment sales in the industrial products division of Automatic Electric Sales Corp., subsidiary of General Telephone & Electronics Corp., Northlake, Ill.

Mr. Ayers will be responsible for coordinating the design, manufacturing and application of the company's industrial products for military sales operations.

Prior to joining the company, he served as president of the Phillips Control Corp. of Joliet.

He was an applications engineer for C. P. Clare & Co. of Chicago for 12 years, and was formerly employed by Automatic Electric as an equipment engineer from 1930-39.

Ayers is a graduate of the University of Illinois with a B.S. degree in electrical engineering, and is a member of the American Institute of Electrical Engineers.

C. D. Cooper To Head AE's Export Shipping Department

C. Darwin Cooper has been appointed supervisor of the newly-created department of export documentation, shipping and order entry at Automatic Electric Co.

This department will handle shipment of various telecommunications products which are distributed by Automatic Electric International, Inc., on behalf of Automatic Electric Co. and its domestic and foreign manufacturing affiliates.

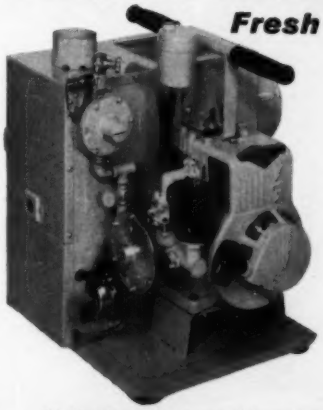
Charles Wenner President James R. Kearney Corp.

Charles Wenner has been elected president of the James R. Kearney Corp. of St. Louis, to replace James R. Kearney Jr., who died suddenly of a heart attack on Oct. 16.

Mr. Wenner is a former vice president and general manager, and more recently, president of the James R. Kearney Corp. of Canada, Ltd.

He began his career in the sales de-

UL listed
propane
VENTILATING HEATER



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- Propane or Butane fuel
- 10' L.P.G. hose standard
- Safe fresh air blown into manhole at all times.
- Eliminates manhole explosion and oxygen deficiency accidents.

Order through your favorite distributor.

Write for illustrated brochure showing all MoPeCo models.

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partment of the parent company in 1929. In 1951 he was named general manager and vice president of the Canadian plant, and in 1958 he was elected president of the Canadian company to succeed Walter Heinrich.

Wenner also served on the board of directors of the Canadian company, and on the board of the James R. Kearney Corp. of St. Louis.

New Everett, Wash. Offices For Thornhill Publishing

Thornhill Publishing Co. recently held an open house in its new offices at 2911 Bond St., Everett, Wash.

The company has 56 employes in the Everett office, which occupies the entire two stories of the building. Thornhill publishes and sells advertising for 130 directories, 55 of them being printed in Everett.

George B. Thornhill, founder of the company, began operations as Thornhill Publishing Co. in Spokane, Wash., in 1946, selling advertising for several Independent directories, but having an outside printer publish them.

In 1957, the Thornhill company started selling classified advertising for the West Coast Telephone Co. in Oregon, Washington, and California and shortly thereafter the company opened offices in the Central Building in Everett.

Thornhill Publishing Co. recently held an open house in its new Everett, Wash. building shown above.

The company grew rapidly and twice had to move its offices to make room for an ever-increasing number of employes. Offices were also set up in Beaverton, Ore. to handle sales for the Oregon and Idaho directories.

In 1955, the company purchased the Turf Building and remodeled the basement to house a complete printing plant and engraving department. By this time,

LOOK TO THE LEADER...

for
- RELIABILITY
- SERVICE
- NATIONALLY KNOWN TELEPHONE SUPPLIES

Prompt delivery of your order as specified is assured by Lindsay's fast, efficient, personalized service. Lindsay specializes in telephone supplies *only* . . . warehousing a complete line of the finest nationally known brands . . . your guarantee of the best as you want it . . . when you want it.

LOOK TO LINDSAY

THE LINDSAY TELEPHONE SUPPLY CO., *Est. 1939*
360 East Highland Road, Northfield, Ohio • Telephone: IMperial 7-7181

the Thornhill company had more than 40 employes in Everett.

In 1956, the company became a division of Western Utilities Corp. of San Francisco, Cal., and established additional offices in Kilgore, Tex., to publish directories for the Southwestern States Telephone Co. in Texas, Arkansas, Louisiana, and Oklahoma. In 1959, Thornhill opened an office in Monrovia, Cal. to publish directories for California Water & Telephone Co.

The Everett directory is the largest now published by Thornhill, but this honor will soon go to some of the new California directories to be published by the company's Monrovia office, it is reported.

U.S.I. Chemicals Names Two Sales Division Heads

Roy A. Parker has been named Kansas City sales division manager for U. S. Industrial Chemicals Co., a division of National Distillers & Chemical Corp. The announcement was made by Alden R. Ludlow Jr., vice president in charge of U.S.I. sales.

R. A. PARKER

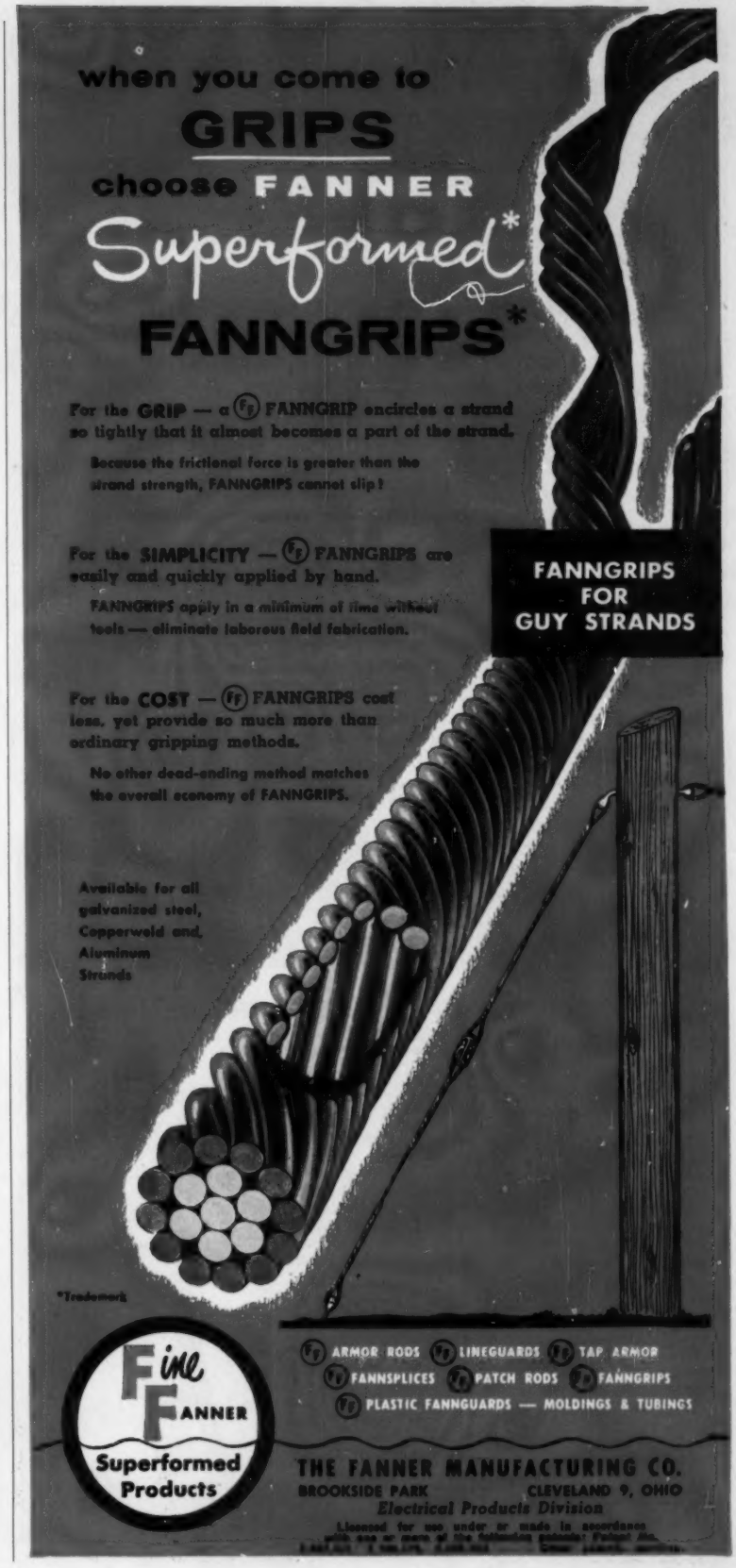
Mr. Parker has been associated with U. S. I. for the past 33 years and, prior to his new assignment, was manager of the company's Kansas City, Mo. sales office.

He is a past president and member of the Paint, Varnish & Lacquer Association, and a member of the Midwest Chemical Sales Club, all of Kansas City.

Joseph G. Longstreth was named manager of the St. Louis, Mo. Sales Office of the U. S. Industrial Chemicals Co.

Mr. Longstreth will report to Roy Parker, manager of the U. S. I. Kansas City sales division.

Mr. Longstreth has been a sales representative for the company in the St.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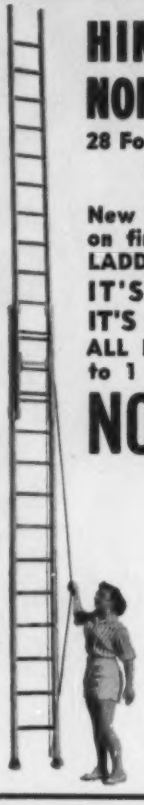

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New Pat. Pend. RUNG LOCK for fast action. Lock snaps on first rung when rope is released. NO RUN-AWAY LADDERS.

IT'S SAFE—IT'S STRONG AND DURABLE
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ALL LADDERS are TESTED and GUARANTEED with a 4 to 1 safety factor (U. S. Standard of Ladders Test).

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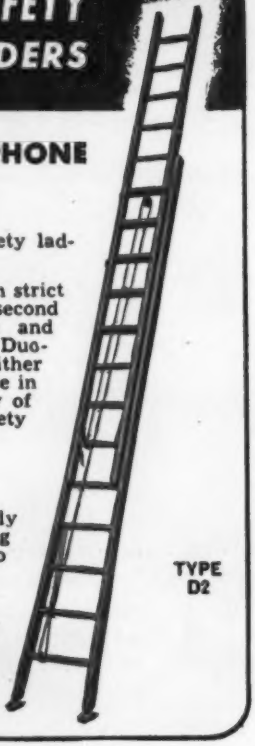
... CUSTOM DESIGNED FOR TELEPHONE MAINTENANCE WORK!

Here's one fine example of the many Duo-Safety ladders ideal for telephone maintenance work.

Type D — a truly great extension ladder built in strict accordance with safety regulations. Rungs are second growth hickory, reinforced with steel rods and equipped with special automatic locks and Duo-Safety's famous Safety Shoes. Made with either straight or parallel side rails, Type D is available in one, two or three sections — in a large variety of sizes. Write for free catalog on all Duo-Safety ladders.

IMMEDIATE DELIVERIES!

Duo-Safety ladders will be shipped immediately upon receipt of order! A planned stock-piling program assures really fast action — there's no delay the Duo-Safety way!



TYPE D2

For Information, Contact Your Supply House, or

DUO-SAFETY LADDER CORP.
809 Ninth Street • Oshkosh, Wisconsin

J. G. LONGSTRETH

Louis area since he joined U. S. I. in 1955.

He was born in St. Louis and is a graduate of Washington University where he obtained an A.B. degree in chemistry and zoology.

He is a member of the Society of Plastics Engineers and of the Associated Drug & Chemical Industries of Missouri.

W. L. Betts Named Holtzer-Cabot Consultant

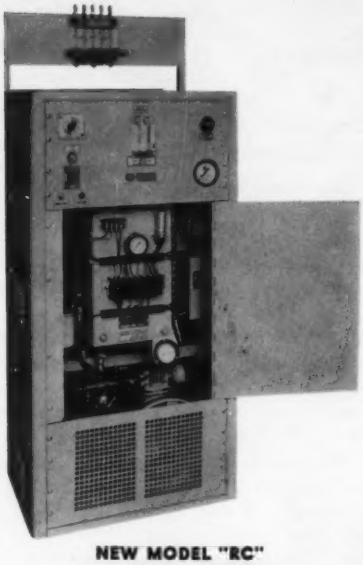
Walter L. Betts, formerly of Bell Telephone Laboratories, Inc., on Nov. 1 was appointed engineering consultant to the Telephone Equipment division of the National Pneumatic Co., Inc., and the Holtzer-Cabot Divisions, Boston, Mass., manufacturer of telephone interrupters and ringing equipment.

Following his retirement after 43 years in engineering development with Bell Telephone Laboratories, Mr. Betts, it is reported, will be active in product planning on future Holtzer-Cabot tele-

NOW! from S&G MANUFACTURING CORP.

THE MODEL "RC" DEHYDRATOR AUTOMATIC

for pressurizing aerial and underground telephone cables



NEW MODEL "RC" cabinet mounted

The Model "RC" Dehydrator is designed to supply dry air to telephone cables. Among its many outstanding safety features are:

- Hi-Lo pressure switch for alarm
- Humistat for alarm above 4% R.H.
- Power failure relays and separate fustat
- By-Pass Valve & Alarm for excessive R.H.
- Mechanical control valve for stand-by air supply (O.P.N.) in event of power failure
- Additional safety features on air compressor
- Power supply is 115-volt, AC on the Dehydrator and Air Compressor
- Power consumption—2 AMPS

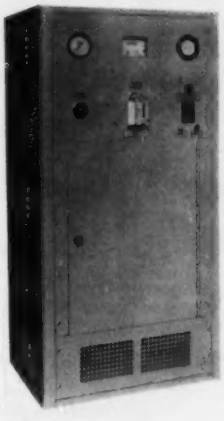
The Model "RC" and "R" Dehydrators Automatic are designed for small installations of 80 miles or less of cable. The Model "RC" is a floor mounted unit, and the Model "R" is for wall mounting. Operating voltage is 115/220 volts, 1 phase, 60 cycle, and the output is 700 standard cubic feet per day maximum, with a dewpoint of —40°F. and power consumption of 2 AMPS.

MOBILE POWER UNIT
Model MPU-4-C

- Generator (slow speed for quietness) 2500 Watt, 110-Volt DC
- Pump—2800 GPH Diaphragm to remove seepage and drain back
- Air Compressor —to put cables under pressure for cutovers or repairs
- Furnished with or without pump and compressor.

MODEL "A"
Air Compressor Dehydrator

Exchange unit equipment designed to supply chemically dry air for telephone cables, aerial and underground, this unit can supply as many as 60 cables. It is equipped with volume recording air meter, high and low pressure alarm switches, humidstat and hour meter.



- Completely automatic in operation
- Air purifier to eliminate oil mist
- Incorporates the latest safety devices

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W. L. BETTS

phone operating devices to match the rapidly expanding markets and changing technologies of the telephone industry.

Mr. Betts was graduated from the Polytechnic Institute of Brooklyn in 1915 with a degree in mechanical engineering. After a year with the Remington Arms Co., he joined the engineering department of the Western Electric Co., now Bell Telephone Laboratories, Inc. He has since been engaged in development in such diverse areas as carrier telephone equipment, public address systems and sound pictures, and ship service and battle announcing equipment for the Navy.

For the past 10 years, Mr. Betts has been associated with the development and procurement of rotating electrical machinery for the Bell System and for various agencies of the Defense Department. During both World Wars I and II, he worked on submarine detection systems, and, in World War II, on anti-aircraft gun directors.

Betts is a member of Pi Tau Sigma, honorary engineering fraternity and the American Society of Mechanical Engineers.

He is chairman of the Engineering Societies Library Board and a licensed professional engineer in the state of New York.

Greenlee Assigns Sales Representatives in 3 Areas

The Greenlee Tool Co. of Rockford, Ill., has announced the assignment of three factory-trained men to sales territories.

Gene Seymour, working out of Merriam, Kan., now travels Nebraska, Kansas, and Missouri.

Bill Farley is responsible for Greenlee sales in Arkansas, Louisiana, Mississippi, and Alabama, with headquarters at Metairie, La.

The territory encompassing North and South Dakota, Minnesota, northern Wisconsin, Michigan's Upper Peninsula, and Iowa is covered by Bill Brasmer, who works out of Minneapolis.

"Do you think that my being the Owner, Manager, Plant Superintendent, Cable Splicer, lineman, C.O.E. Maintenance Man, Secretary and Janitor of a independent rural telephone company has anything to do with my split personality, Doctor??"

Book Reviews

"TRANSISTORS—THEORY AND PRACTICE," by Rufus P. Turner; second edition; 160 pages, illustrated; $2.95.

This book leaves very little to be desired in the way of information about transistors. A couple of chapters are devoted to the physics of semi-conductors, and even the method of manufacture is covered.

However, there is nothing stuffy about the explanations. Profuse illustrations, show everything from atoms and molecules to pulling a crystal from the germanium melt.

A short chapter deals with duality in transistor circuit design; duality meaning conditions where voltage behaves in one circuit like current does in its "dual."

This chapter should stimulate a manner of thinking that circuit men will welcome. About half of the book is devoted to practical transistor circuits, including testing and measuring techniques.

This edition contains information on the latest devices in the semi-conductor field, including thyristors, spacistors, four-layer diodes and phototransistors. It is available through TELEPHONY.

•

"FUNDAMENTALS OF TRANSISTORS," by Leonard Krugman; second edition; 176 pages, illustrated; $3.50.

The author is the manager of the advanced development section of one of RCA's divisions. The text is terse and leans somewhat on mathematics for the explanations. The latest developments are covered — including the avalanche and drift transistors and the spacistors — but in few words.

Long chapters are devoted to specific circuit configurations such as the grounded base transistor, the grounded emitter transistor, etc. This is a book for the engineer rather than the experimenter. You can purchase it from TELEPHONY.

•

"HOW TO TROUBLESHOOT A TV RECEIVER," by J. Richard Johnson; 160 pages, illustrated; $2.50.

Ordinarily one would not expect a tv book to be of much use to a telephone man, unless he is one of the breed who cannot resist trying to fix everything electronic that he can lay his hands on.

This book, however, turns out to be "different." It wastes no space on alignment procedures, or high level theory, but gets direct to the point of showing the reader what to do when the set quits working.

The big advantage in this text is that it discusses the "thinking" that backs up successful trouble shooting. Anyone in the business of repairing electronic devices can learn something from this book, even if he never tries to fix a tv set. This book is available from TELEPHONY.

•

"AUDIO MEASUREMENTS," by Norman Crowhurst; 224 pages; $2.90.

While the progress of electronics has raced into higher frequencies, the audio field has largely been neglected in popular literature. This book makes up for some of this neglect. It covers the test equipment and basic measurements used in audio-frequency work. Although many of the techniques mentioned are applicable to telephone voice frequency measurements, this book will be of most use to those working in fields of higher fidelity than the telephone. It is available from TELEPHONY.

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WAVE ANALYZER

Offers fast accurate amplitude measurements throughout the frequency spectrum of 300 cycles to 400 Kc

This instrument utilizes the heterodyne principle with balanced modulation and highly selective crystal filters which achieve the high resolution needed for accurate amplitude measurements of Carrier and Microwave Sub Carrier channels.

Direct reading in DBM for 135 and 600 ohm circuits or bridging.

SPECIFICATIONS
Model 2174-A

Frequency Range: 300 cycles to 400 Kc. Level:—72 dbm to + 32 dbm (full scale) at 600 OHMS Accuracy: ± .5db from —80 to +32 dbm; 1 to 400 Kc. Selectivity: 6db down 80 cycles off: 60 db down 480 cycles off. Wider crystal filter and demodulator for monitoring SSB, AM, and FM—internal speaker and headset jack. Spurious Response: Below 60db, low intermodulation: Below 60 db. Power Requirements: 115V, 50/60 cycles—48 Watts. Weight, 28 lbs.

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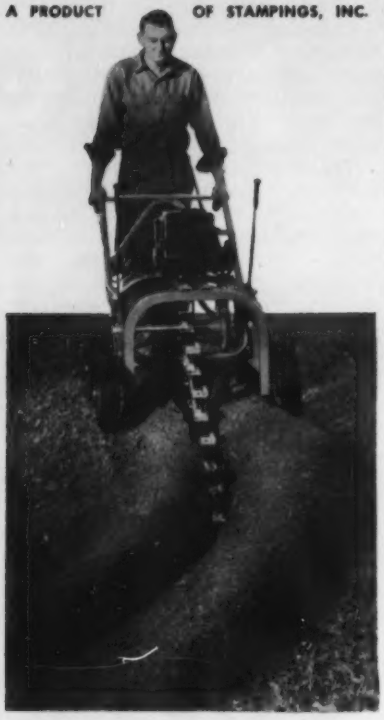

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North Electric Commissions Wright Brothers Sculptures

Oskar J. W. Hansen, internationally-known American historical sculptor, has accepted a commission from North Electric Co., Galion, O., to create a set of bronze busts of Orville and Wilbur Wright for the Wright Brothers' National Memorial at Kitty Hawk, N. C.

The life-sized busts will be created in bronze 24 inches high mounted on 42-inch granite pedestals flanking both sides of the steps at the base of the Memorial. According to the contract, they must be finished in time for installation and dedication next May and will depict the two pioneers as young men at the age they made their historic world's first powered flight.

The Charlottesville, Va. artist signed the contract in Washington, D. C., before Hillory A. Tolson, assistant director, National Park Service, which, on behalf of the people of the United States, will accept the works at the on-site dedication in the spring.

The event was given an international flavor by the presence of Robert Valeur, French embassy minister, on hand to offer thanks for his government in advance for a set of original duplicates of the busts which will go to the French Air Museum in Paris at a later date.

Also present to acknowledge the company's gesture were Gen. E. B. Le Bailly, Air Force deputy director of information, and Ralph Whitener, program director of the Air Force Association, which co-sponsers the annual Wright Memorial anniversary celebration at Kitty Hawk each Dec. 17.

North Electric's assistant to the president, Adm. Fritz Gleim, USN (ret.), signed for the company's president William Tucker, who announces: "The Wright busts are a gift to the people of the United States, offered in a spirit of public service and as a tribute to the progressive spirit of the Air Force as first evidenced by the Wright Brothers in their epic flights near Kill Devil Hill."

Sculptor Hansen has won wide recognition for many of his outstanding works, includuing the "liberty" statue completed in 1956 for the Yorktown Memorial; the bronze sculptures at Boulder Dam, and busts of the Wrights, as older men, now in the Smithsonian Institution.

Oskar J. W. Hansen, well-known American sculptor (right), indicates where new busts of Wright brothers will be placed at base of Memorial at Kitty Hawk, N. C., near the spot where the first flight was made. Seated with sculptor Hansen is Admiral Fritz Gleim, assistant to the president, North Electric Co., the Ohio firm which commissioned the work. Standing left to right: Ralph Whitener, program director, Air Force Association; Robert Valeur, minister, French Embassy; General E. B. LeBailly, deputy director of information, USAF and Hillory A. Tolson, assistant director, National Park Service.

Fast, convenient, dependable precision wave analyzers

for wave analysis, wire carrier and microwave subcarrier measurements

Sierra 121A Wave Analyzer is a double superheterodyne receiver covering 15 KC to 500 KC. It provides data directly in volts and dbm at 600 ohms, and offers high selectivity required for single sideband carrier measurements.

Sierra 158A Wave Analyzer is similar to Model 121A but covers 500 KC to 10 MC.

Both instruments have ±2 db accuracy, spurious response at least 50 db down, and signal measurement range of 77.5 μv to 97.5 volts. Available for either cabinet or relay rack mounting.

Frequency-selective carrier-frequency voltmeters

For carrier frequency and other field or laboratory work between 3 KC and 800 KC, Sierra offers five accurate, stable tuned vacuum tube voltmeters. All are direct reading in voltage and dbm at 600 ohms from —80 dbm to +42 dbm. All feature built-in calibration oscillators, level calibration circuits, aural monitoring jacks, and (except 103B) precision spiral scale dials. All are ruggedly constructed of quality components for long operating dependability.

SPECIFICATIONS — SIERRA VOLTMETERS

Model	Frequency Range—kc	Selectivity		Accuracy		Direct Reading in dbm	
		Down 3db	Down 45db	Frequency	Measuring	Balanced	Unbalanced
101C	20-500	± 550 cps	± 2900 cps	Note A	± 3 db	Note D	600 ohms
103B†	3- 40	± 400 cps	± 3000 cps	± 0.5 kc	± 3 db	Note D	600 ohms
104A	5-150	± 300 cps	± 1500 cps	± 1 kc	± 3 db	Note D	600 ohms
108B	15-500	± 550 cps	± 2900 cps	± 3 kc Note B	± 2 db Note C	135 ohms Note D	600 ohms
114A	100-800	± 550 cps	± 2900 cps	Note A	± 3 db	Note D	600 ohms

† Contains carrier re-insertion oscillator for monitoring suppressed carrier systems. Furnished with planetary drive dial. Note A. Ranges from ± 2 KC at low end of dial to ± 3 KC at upper end. Note B. ± 1 KC in the 48 KC to 256 KC region. Note C. ± 1 db for + 30 db to —40 db attenuator steps on 135 ohm balanced measurements. Note D. All models may be converted for 135 and 600 ohm balanced line measurements by convenient plug-in bridging transformer, Model 130D.

Data subject to change without notice.

Sierra Electronic Corporation

A Division of Philco Corporation

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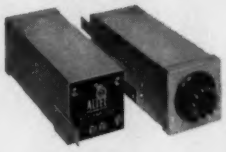
The advanced design of ALTEC telephone equipment makes it ideal for modern telephone systems. In addition to its reliability and high standard of performance, ALTEC equipment requires a minimum amount of space. Inherent flexibility makes it useful in a wide range of applications. Easy maintenance is **designed** in to save time and money in servicing.



447A TRANSISTOR AMPLIFIER

Telephone Repeater Type

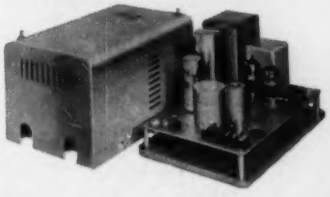
Directly interchangeable with vacuum tube repeaters; dimensions are identical. Requires only 24 - 48 volts. Eliminates need for 130v supply.

SPECIFICATIONS:

Type: Repeater Amplifier (transistorized) • Gain: 37 db from and into 600 ohm loads • Power Output: +18 dbm (at +10 dbm distortion is 1.5%, 300-3000 cps) • Frequency Response: —1 db at 200 and 5000 cps referred to 1000 cps • Input Impedance: 600 ohms • Output Impedance: 600 ohms • Output Noise Level: —70 dbm • Controls: Input volume control which varies gain from —2 db to maximum gain • Power Required: 17 - 24 v (50 ma @ 20 volts) • Transistors: 1—2N191, 1—2N188A • Dimensions: 1¾" x 1¾" x 6" • Color: Cadmium plate with dichromate finish • Weight: 14 oz. • Mounting: 11 pin Amphenol 86 CPN plug • Monitor Tap: Auxiliary output winding 11 db below 600 ohm winding available at test jacks on front panel and at connector pins at rear of unit • Accessories: Panel for rack mounting 10 repeaters; Rack mounting power supply capable of energizing 100 repeaters; Equalizer; Panel for mounting up to 10 equalizers; Assembly for mounting a 447A in 105B apparatus box.

444B AMPLIFIER COMPRESSION TYPE

Compression, attack and recovery times are fixed quantities providing optimum performance for message use.



SPECIFICATIONS:

Type: Compressor Amplifier • Gain: 600 ohm input: 70 db • Bridging input: 57 db bridging 600 ohm line • Maximum Compression: 35 db change in input results in 15 db change in output • Power Output: 34 dbm at 30 db compression; 35 dbm with rectifier tube removed • Frequency Response: —2 db at 100 and 3000 cps relative to 1000 cps; More than 10 db down at 10,000 cps • Input Impedance: 600 ohms balanced and 12,000 ohms balanced for bridging • Source Impedance: 600 ohms • Load Impedance: 4 and 600 ohms • Noise Level: 80 db below rated output; —115 dbm equivalent input noise • Power Supply: 117 volts, 60 cps, 30 watts • Tubes: 1—6BC8, 1—6AL5, 2—12BY7A • Dimensions: 9" x 6" x 5" • Weight: 7½ lbs. • Attack Time: 50 milliseconds • Recovery Time: 1 second for 63% recovery • Harmonic Distortion: At 33 dbm output, less than 5%, 200 - 4000 cps; At 30 dbm output, less than 2%, 200 - 4000 cps.

S-17B PROGRAM AMPLIFIER SYSTEM

Cabinet houses two program-quality 437B amplifiers capable of multiple tandem operation, two 17224 equalizers, and two jack fields to facilitate testing, equalizing, and monitoring. Each amplifier contains its own AC power supply and mounts in the cabinet independently on a plug-in basis for easy replacement and centralized maintenance.

SPECIFICATIONS:

Output Power: +24 dbm • Distortion: not over ½% THD (30 - 15,000 CPS at +24 dbm) • Gain: at least 44 db; adjustable to minimum of 8 db • Gain adjustment: 2 db steps and 1½ db vernier • Frequency response: ±1 db, 20 - 20,000 cps • Equiv. input noise: —115 dbm • Input impedance (internal): 150/600 ohms ±5% • Output impedance (internal): 150/600 ohms ±5% as measured at output of the bridge • Longitudinal balance of input circuit and output circuit with 600 ohm connection: 55 to 60 db at 40 and 15,000 cps; 70 db at 1000 cps • Tubes: 1—12AY7, 2—12BY7A • Electrolytic condensers: Sprague 17D or equivalent • Transformer insulation: 1500 volt insulation between primary and secondary windings • Impendance change simply accomplished by reversing the impedance plug. Occupies 9⅜" of 19" rack space.

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Alton O. McLane (center), chief engineer of Gustav Hirsch Organization, Inc., operations in Alaska, is shown receiving an award from the United States Air Force. At left is Milton Staub, president of the Gustav Hirsch Organization, and Lt. Gen. Frank A. Armstrong, chief of the Alaskan command.

McLane of Gustav Hirsch Organization Gets Award

Alton O. McLane, chief engineer of Gustav Hirsch Organization Inc. operations in Alaska, recently received an award from the United States Air Force in appreciation of special services he has performed for the Alaskan Air Command.

The citation, which was made by Secretary of the Air Force James H. Douglas, reads in part:

"The outstanding professional knowledge and selfless devotion to duty displayed by Mr. McLane were instrumental in the development of comprehensive plans for adequate long-lines communications service within and through Alaska.

"His initiative, imaginative planning and thorough understanding of subscribers' future needs assured the timely submission to the Joint Chiefs of Staff of a coordinated theater communications plan covering requirements for the next five years.

"The distinctive accomplishments of Mr. McLane reflect great credit upon himself and have earned for him the sincere appreciation of the United States Air Force."

Buchanan Heads Printing Division, Suttle Equipment

C. L. Lineberger, executive vice president of Suttle Equipment Corp., recently announced that Reuel Buchanan has been appointed manager of the Suttle Printing Division of Suttle Equipment Corp.

Mr. Buchanan has had printing experience in both letter press, off-set, and directory printing, with a total of 22 years in the graphic arts industry. He

REUEL BUCHANAN

formerly made his home in London, Ky. and now resides in Lawrenceville, Ill.

In addition to managing the offset and letter press departments of the Suttle Printing Division, Mr. Buchanan also directs the production functions of the Suttle Directory Co. and markets Suttle Equipment Corp.'s line of printed forms, including accounting machine forms, carbonized and snap-out types.

Not As Envisioned

"If the men who signed the Declaration of Independence could revisit the American Republic tomorrow, they would be amazed by many things. They would find causes for pride and satisfaction in the development of their handiwork; they would also find causes for . . . regret. . . . Committed to the ideal of a limited government of divided powers, they would not, one suspects, be admirers of a proliferating centralized bureaucracy. And they would see as symptoms of moral softness the modern tendency to use public money as a bribe to voters and the widespread tendency to substitute state help for self-help."—WILLIAM HENRY CHAMBERLIN, *Columnist.*

Foster Basic Research

"The future of the United States, to an extraordinary degree, is in the hands of those who probe the mysteries of the atom, the cell, and the stars. Especially is this true of that tiny part of our creative effort which we inadequately term basic research."—JAMES R. KILLIAN JR., *special assistant to the President for science and technology.*

Recent Quotations of Independent Telephone Stocks

	11/30/59 BID	11/30/59 ASKED	10/30/59 BID	10/30/59 ASKED
Anglo-Canadian Telephone Co.	35½	36¼	37	37¾
California Interstate Telephone Co.	14	14½	14½	15
California Pacific Utilities Co.	38	38¾	35⅞	36¼
California Water & Telephone Co.	27½	27⅞	26	26½
Carolina Telephone & Telegraph Co. (1)	35½	37½	172	175
Central Telephone Co. (2)	23	23¾	27½	28
Chenango & Unadilla Telephone Co.	27	28	27	27½
Cincinnati & Suburban Bell Telephone Co.	91	92	90½	91
Citizens Util A	16	16½	15¾	16¼
Citizens Util B	13⅛	13½	12¾	13⅛
Commonwealth Telephone Co.	19	19¾	18½	19
Florida Telephone Corp. Class A	29	29¾	28½	29¼
General Telephone Corp. Common	76⅜	Last Sale	71¾	Last Sale
Hawaiian Telephone	20½	21½	20	21½
Indiana Telephone Corp.	21	23	19	21
Inter-County Telephone & Telegraph Co.	56	59	55½	58½
Inter-Mountain Telephone Co.	15⅝	16	15¾	16⅛
Lincoln Telephone & Telegraph Co.	60½	Bid	60	Bid
Middle States Telephone Co. of Illinois	23½	24¼	23	24
North Carolina Telephone Co.	1⅝	1¾	1½	⅝
Northern Ohio Telephone Co.	50	53	45	47
Peoples Telephone Co.	90	Bid	90	Bid
Rochester Telephone Corp.	24½	Last Sale	26	Last Sale
Southern Nevada Telephone Co.	22¼	23¼	21	22
Southern New England Telephone Co.	44⅜	45¼	43⅜	43⅞
Southwestern States Telephone Co.	24	24⅜	23¼	23¼
Telephone Service Co. of Ohio Class A	122	128	118	122
Tidewater Telephone Co.	25½	26½	24	26½
United Utilities, Inc.	37¼	37¾	38¼	39
West Coast Telephone Co.	24¾	25½	24¼	24⅝
Western Light & Telephone Co., Inc.	40½	41½	39	39¾

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(Quotations supplied by Merrill Lynch, Pierce, Fenner & Smith)

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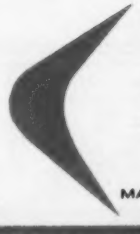

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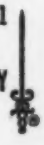

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